



Terraprobe

*Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing*

**FOUNDATION INVESTIGATION & DESIGN REPORT
DEEP CUTS & HIGH FILLS
HIGHWAY 406 TWINNING
PORT ROBINSION ROAD TO EAST MAIN STREET
AGREEMENT No. 2008-E-0016, W.P. 280-99-00
GEOCRES No. 30M3-263
VOLUME II**

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File No. 1-09-4135
September 03, 2010

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TABLE OF CONTENTS Volume I

Part 1

1	INTRODUCTION.....	1
2	SITE DESCRIPTION & PHYSIOGRAPHY.....	2
3	SITE INVESTIGATION AND FIELD TESTING.....	2
4	LABORATORY TESTING.....	7
5	DESCRIPTION OF SUBSURFACE CONDITIONS.....	7
5.1	Site 1 – Ramp East Main Street E – N.....	7
5.1.1	Topsoil.....	7
5.1.2	Silty Clay.....	7
5.1.3	Clayey Silt.....	8
5.1.4	Silty Clay Till.....	9
5.1.5	Silt Till.....	9
5.1.6	Water Levels.....	10
5.2	Site 2 – Woodlawn I/C Southeast Quadrant.....	10
5.2.1	Topsoil.....	11
5.2.2	Fill – Sand and Gravel.....	11
5.2.3	Fill – Silty Clay.....	11
5.2.4	Silty Clay.....	12
5.2.5	Silt.....	13
5.2.6	Silty Clay to Clayey Silt Till.....	13
5.2.7	Silty Sand Till.....	14
5.2.8	Sand and Gravel Till.....	14
5.2.9	Bedrock (Salina Formation).....	14
5.2.10	Water Levels.....	15
5.3	Site 3 – Woodlawn I/C Southwest Quadrant.....	16
5.3.1	Topsoil.....	16
5.3.2	Fill – Silty Clay.....	16
5.3.3	Silty Clay.....	17
5.3.4	Clayey Silt to Silty Clay Till.....	18
5.3.5	Sand.....	18
5.3.6	Silty Sand to Sand and Silt Till.....	19
5.3.7	Bedrock (Salina Formation).....	19
5.3.8	Water Levels.....	20
5.4	Site 4 – Highway 406 NBL & SBL.....	20
5.4.1	Topsoil.....	21
5.4.2	Fill – Sandy Gravel to Gravelly Sand.....	21
5.4.3	Fill – Silty Sand to Sand and Silt.....	21
5.4.4	Fill – Silty Clay.....	21
5.4.5	Silty Clay.....	22
5.4.6	Silt.....	23



5.4.7	Clayey Silt	24
5.4.8	Silty Clay to Clayey Silt Till	24
5.4.9	Sand	25
5.4.10	Sandy Silt to Silty Sand Till	25
5.4.11	Sandy Gravel to Sand and Gravel Till	26
5.4.12	Bedrock (Salina Formation)	26
5.4.13	Water Levels	27
5.5	Miscellaneous	29

Part 2

6	DISCUSSION AND RECOMMENDATIONS	31
6.1	General	31
6.2	SITE 1 – Ramp East Main Street E – N	34
6.2.1	General	34
6.2.2	Design Considerations	34
6.3	SITE 2 – Woodlawn I/C Southeast Quadrant	35
6.3.1	General	35
6.3.2	Embankment Stability	35
6.3.3	Embankment Settlement	36
6.4	SITE 3 – Woodlawn I/C Southwest Quadrant	37
6.4.1	General	37
6.4.2	Embankment Stability	37
6.4.3	Embankment Settlement	38
6.5	SITE 4 – Highway 406 NBL & SBL	40
6.5.1	General	40
6.5.2	Embankment Stability	40
6.5.3	Embankment Settlement	41
7	CONSTRUCTION STAGING	42
8	CONSTRUCTION CONSIDERATIONS	43
8.1	SITE 1 – Ramp East Main Street E – N	43
8.2	SITE 2 – Woodlawn I/C Southeast Quadrant, SITE 3 – Woodlawn I/C Southwest Quadrant, SITE 4 – Highway 406 NBL & SBL	44
9	SEISMIC CONSIDERATIONS	45
9.1.1	Liquefaction Potential	45



Tables

Table 1 – List of Standard Specifications Referenced in Report

Appendices

Site 1

Appendix A1 – Record of Borehole Sheets
Appendix B1 – Laboratory Test Results
Appendix C1 – Drawings titled “Borehole Locations and Soil Strata”

Site 2

Appendix A2 – Record of Borehole Sheets
Appendix B2 – Laboratory Test Results
Appendix C2 – Drawings titled “Borehole Locations and Soil Strata”

Site 3

Appendix A3 – Record of Borehole Sheets
Appendix B3 – Laboratory Test Results
Appendix C3 – Drawings titled “Borehole Locations and Soil Strata”

Site 4

Appendix A4 – Record of Borehole Sheets
Appendix B4 – Laboratory Test Results
Appendix C4 – Drawings titled “Borehole Locations and Soil Strata”

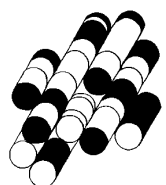
Volume II

Appendix D1 – D4	Slope Stability Data and Results
Appendix E	Comparison of Embankment Alternatives
Appendix F	Settlement Parameters and Results
Appendix G	Figures
Appendix H	Special Provision Supply & Installation of Embankment Monitoring Equipment



APPENDIX D

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D1

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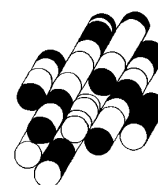


FIGURE 1-1A

Terraprobe

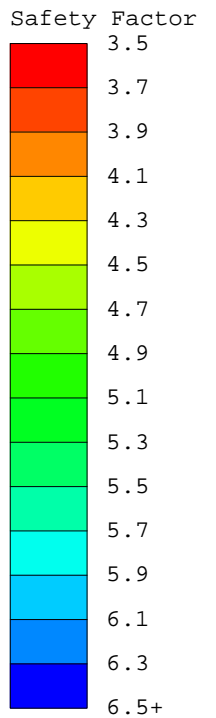
Job No.: 1-09-4135
Section: 10+075
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 120 kPa
Friction Angle: 0 deg

2 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 120 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety



Hwy 406 Twinning - East Main St.

W

Pavement Subgrade

Critical Failure Surface

Scale 1:350.0

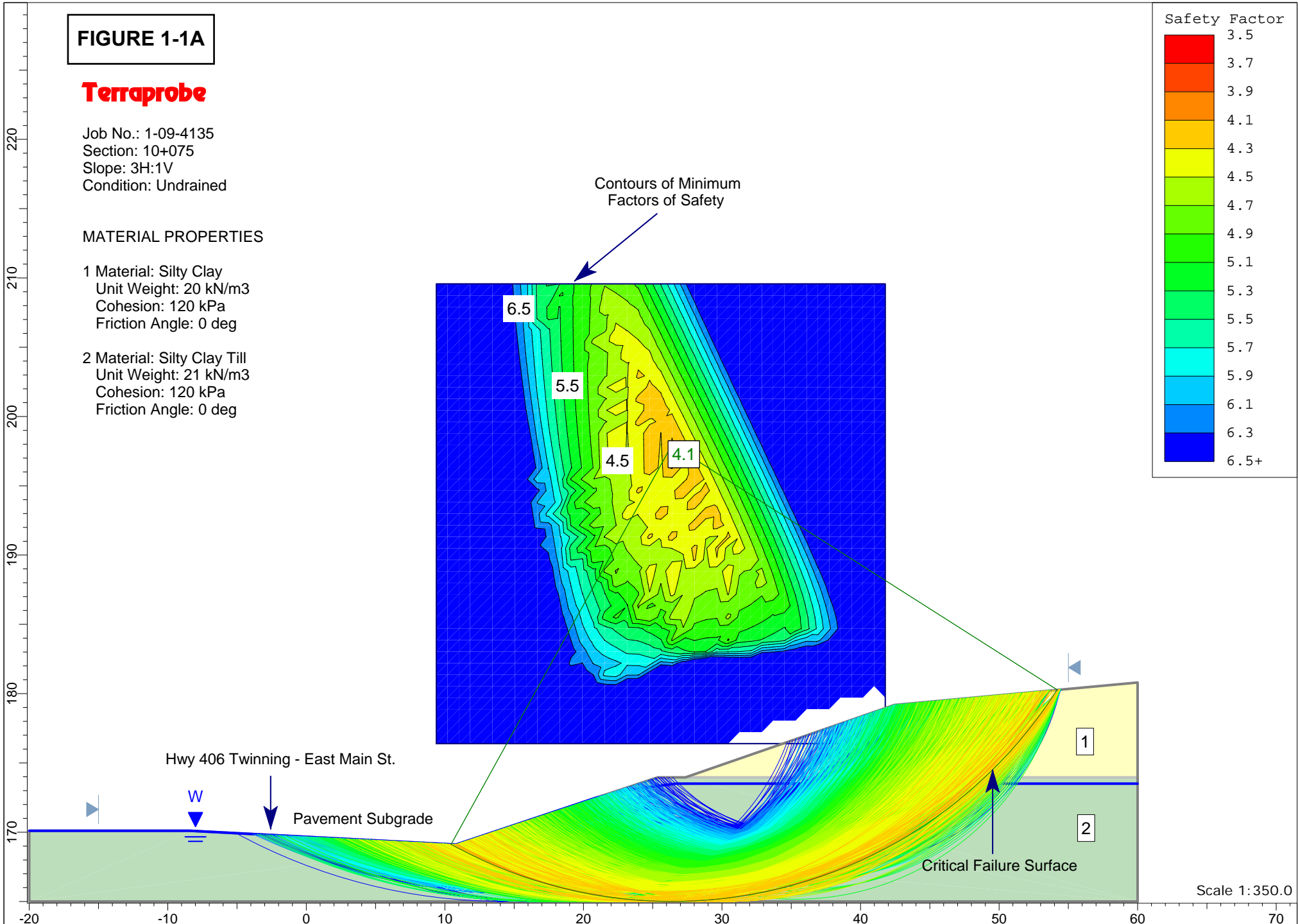


FIGURE 1-1B

Terraprobe

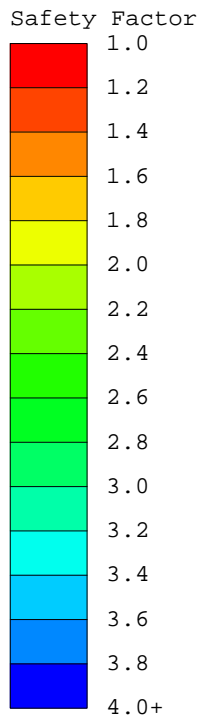
Job No.: 1-09-4135
Section: 10+075
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 27 deg

2 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety



Hwy 406 Twinning - East Main St.

W

Pavement Subgrade

Critical Failure Surface

Scale 1:350.0

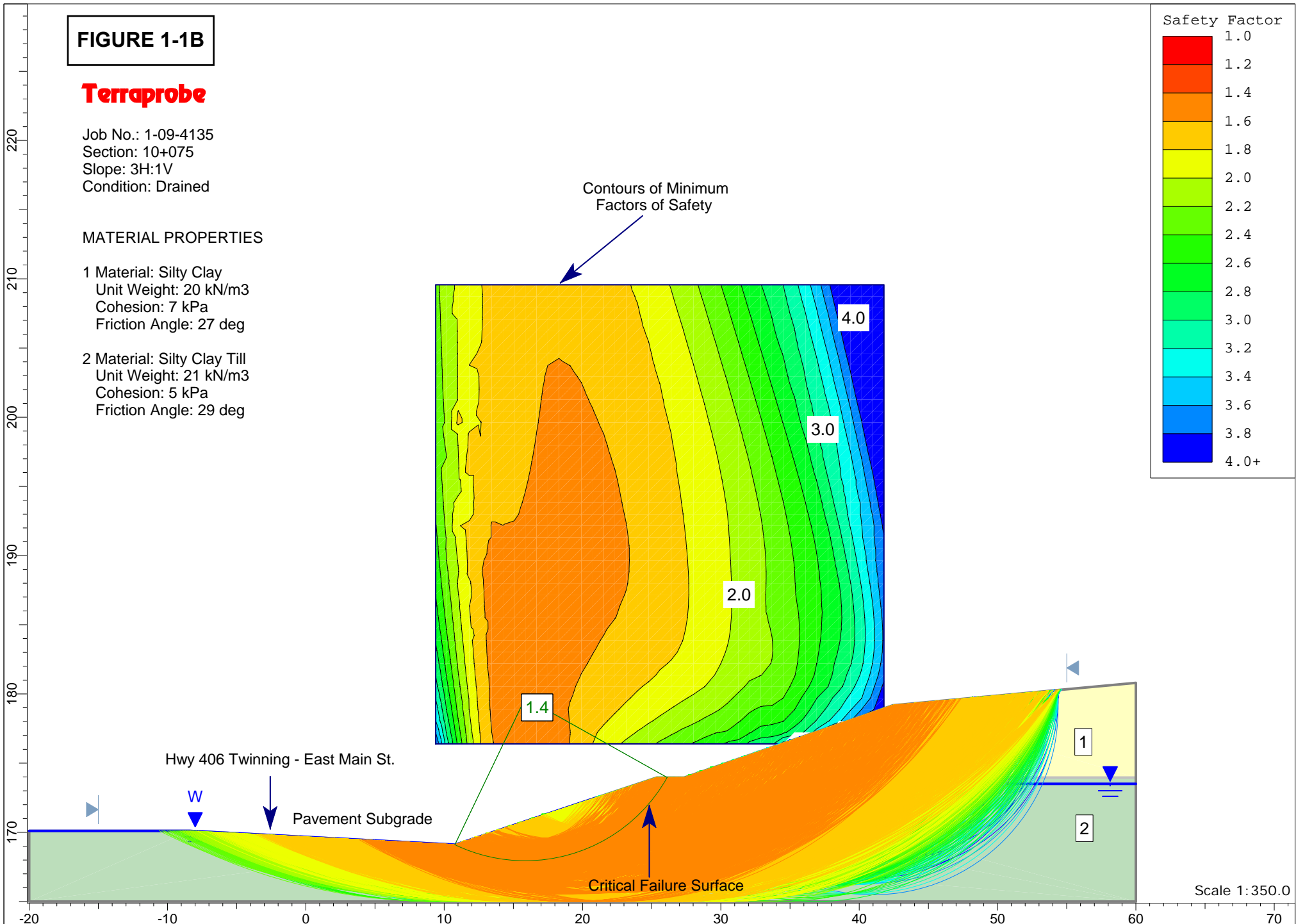


FIGURE 1-2A

Terraprobe

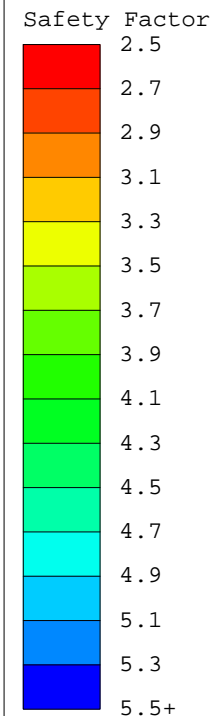
Job No.: 1-09-4135
Section: 10+125LT
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

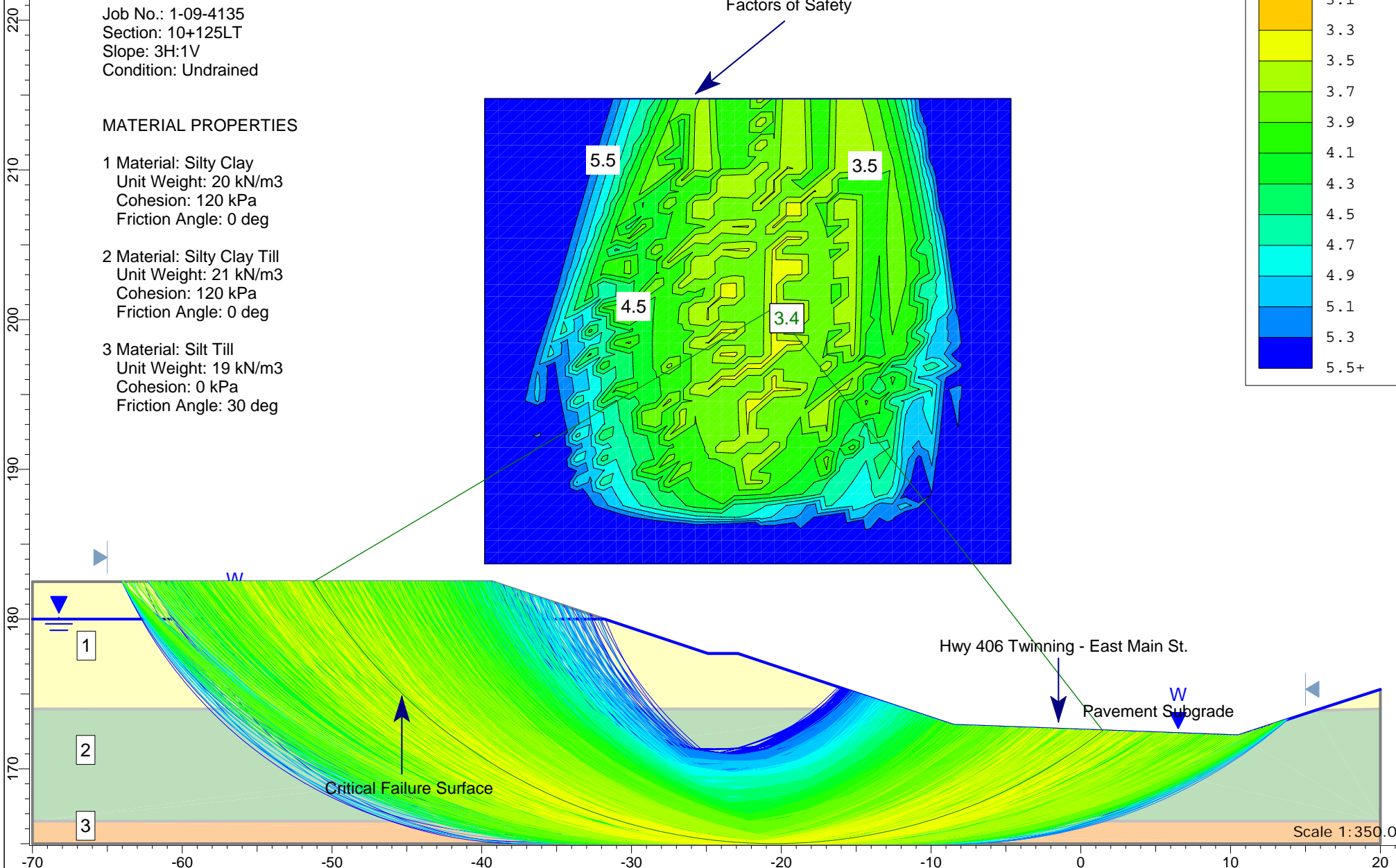
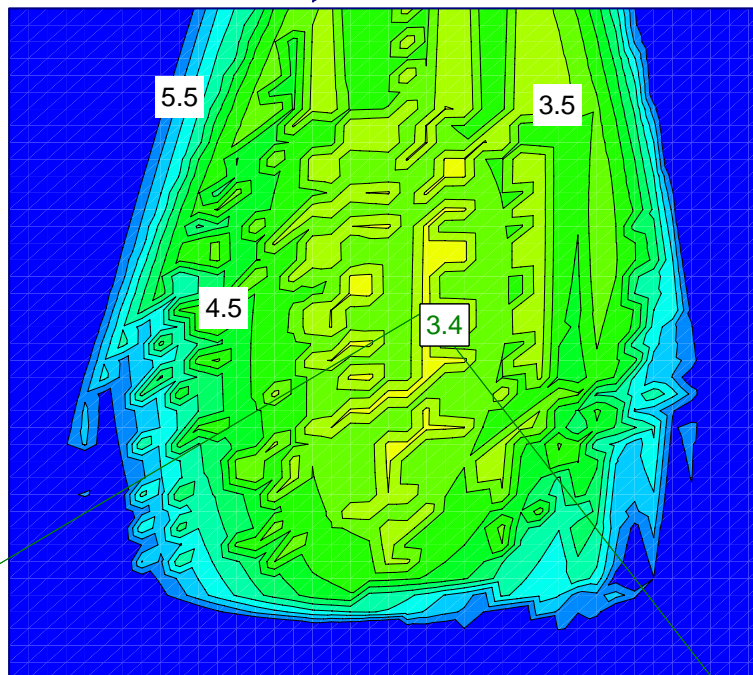
1 Material: Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 120 kPa
Friction Angle: 0 deg

2 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 120 kPa
Friction Angle: 0 deg

3 Material: Silt Till
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 30 deg



Contours of Minimum
Factors of Safety



Terraprobe

MATERIAL PROPERTIES

3 Material: Silt Till
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 30 deg

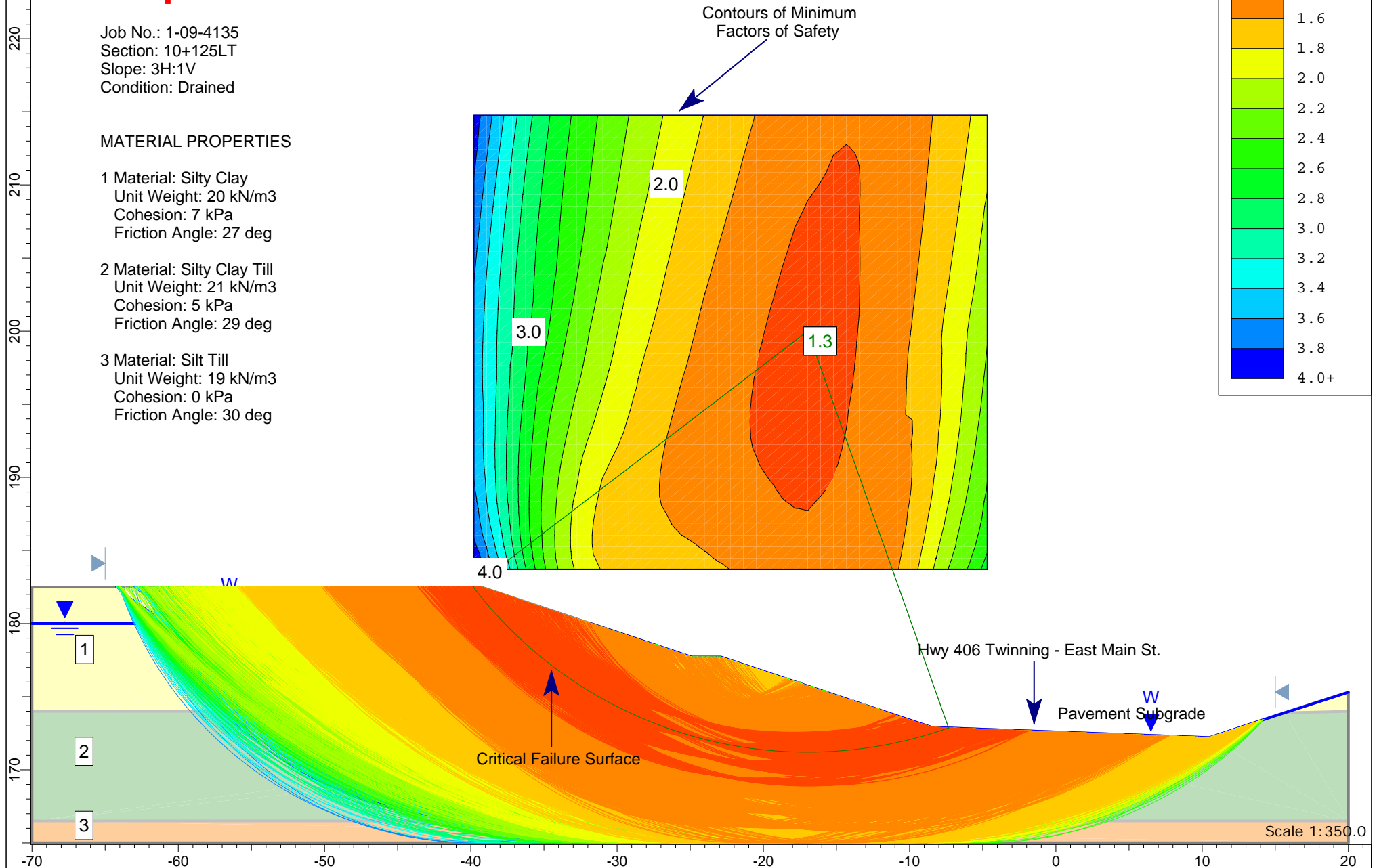


FIGURE 1-3A

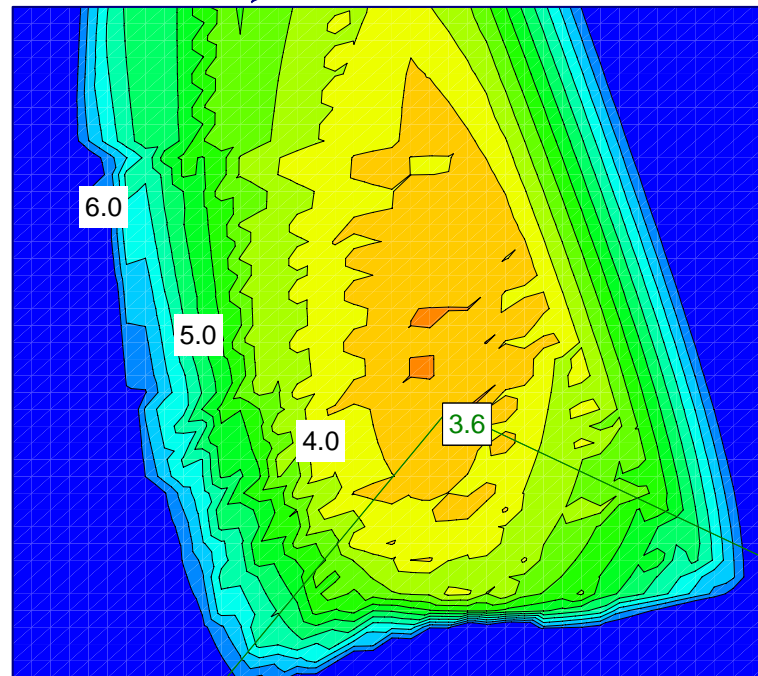
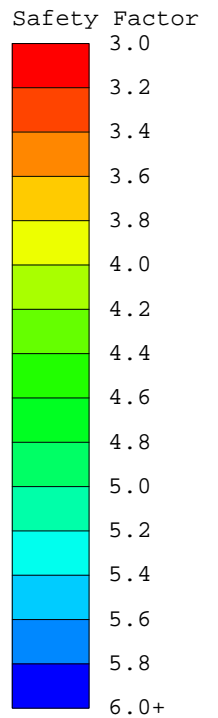
Terraprobe

Job No.: 1-09-4135
Section: 10+125RT
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 120 kPa
Friction Angle: 0 deg
- 2 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 120 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety



Hwy 406 Twinning - East Main St.

W

Pavement Subgrade

Critical Failure Surface

Scale 1:350.0

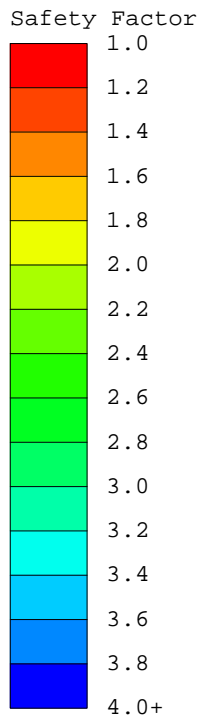
FIGURE 1-3B

Terraprobe

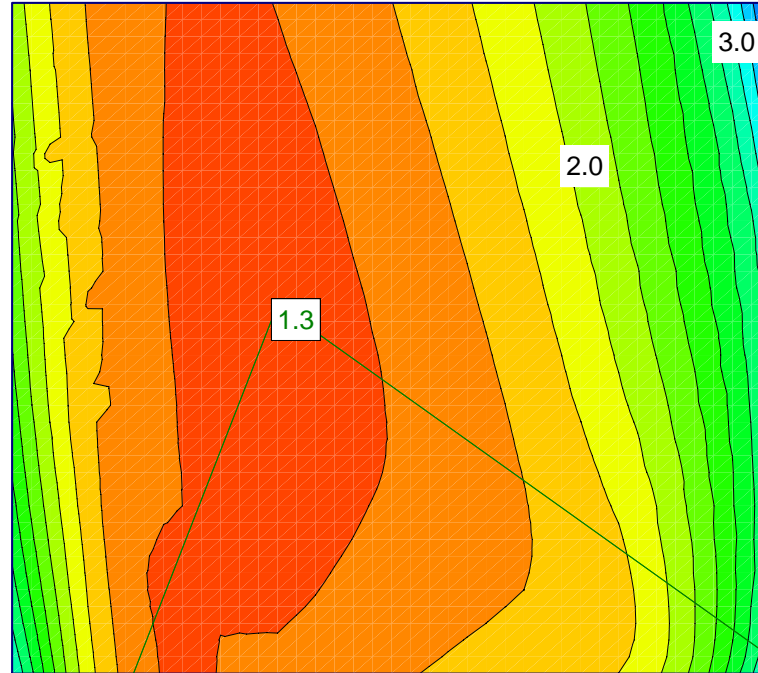
Job No.: 1-09-4135
Section: 10+125RT
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 27 deg
- 2 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



Hwy 406 Twinning - East Main St.

W

Pavement Subgrade

Critical Failure Surface

Scale 1:350.0

FIGURE 1-4A

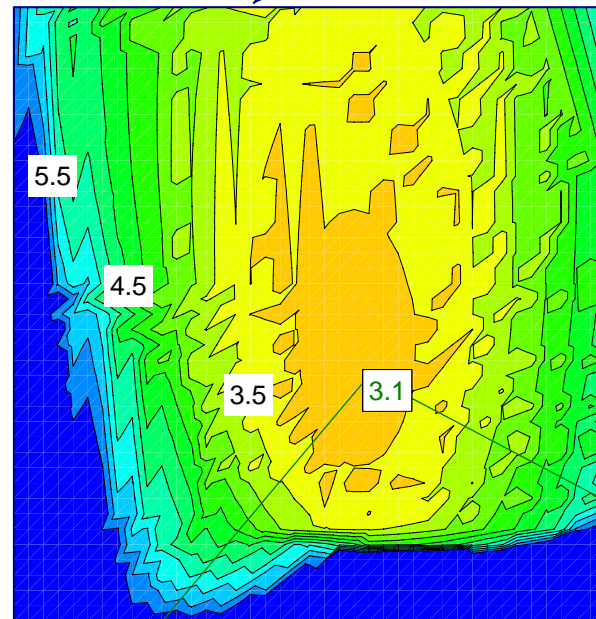
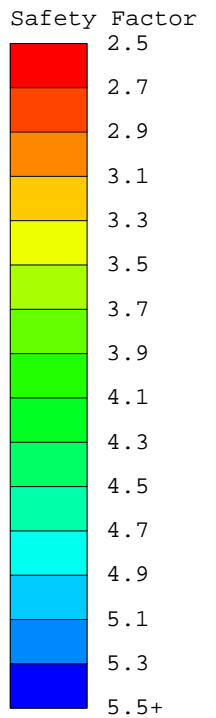
Terraprobe

Job No.: 1-09-4135
Section: 10+175
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Upper Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 120 kPa
Friction Angle: 0 deg
- 2 Material: Lower Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 75 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety



Hwy 406 Twinning - East Main St.

W

Pavement Subgrade

ROW

Critical Failure Surface

1

2

3

Scale 1:350.0

FIGURE 1-4B

Terraprobe

Job No.: 1-09-4135
Section: 10+175
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Upper Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 27 deg
- 2 Material: Lower Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 27 deg
- 3 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

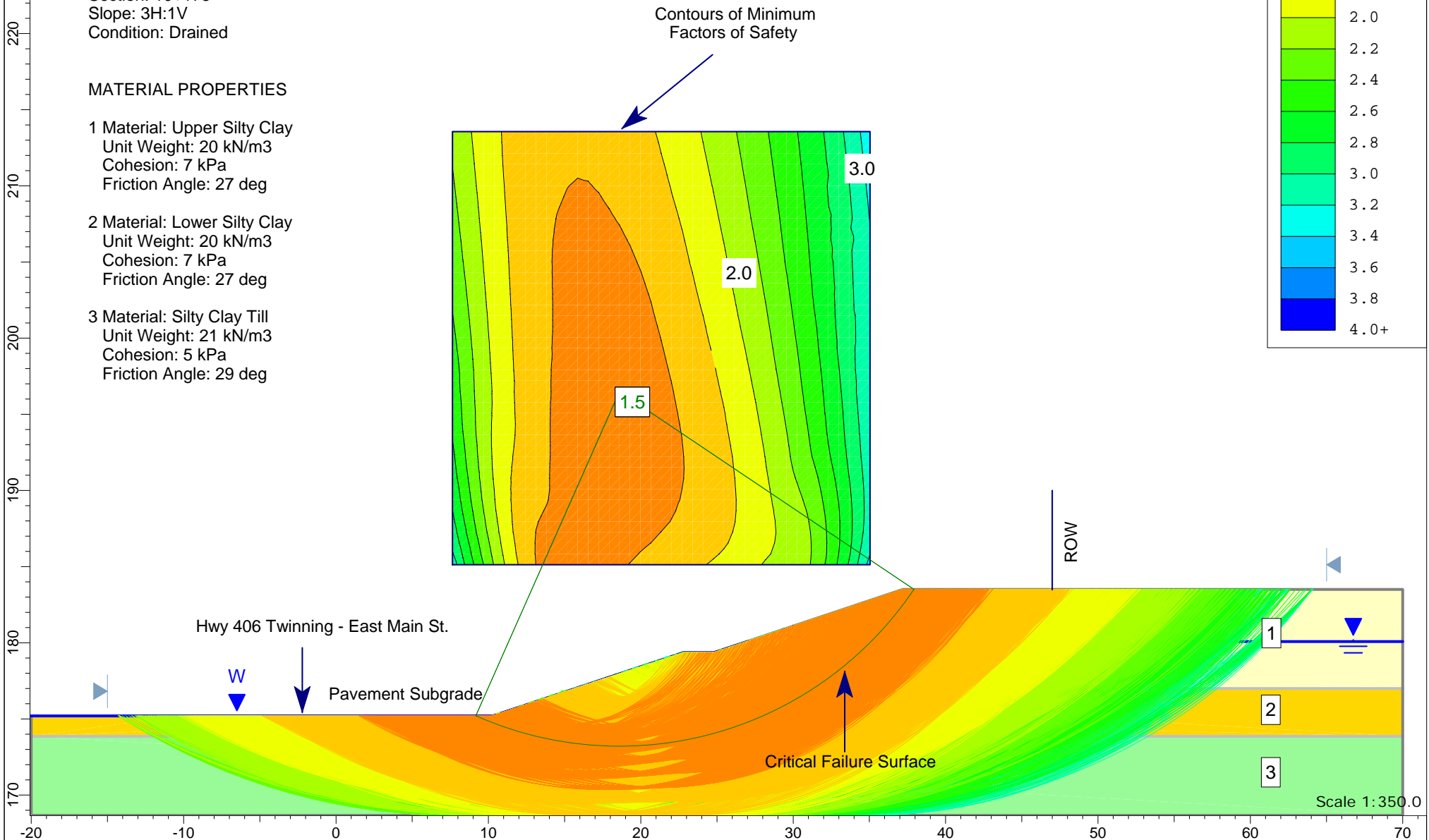
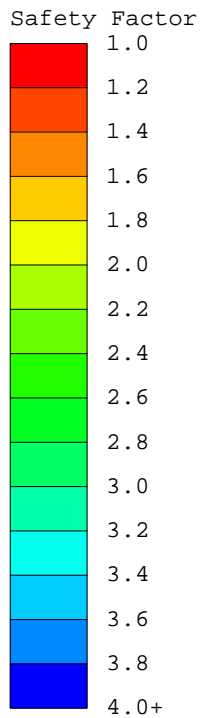


FIGURE 1-5A

Terraprobe

Job No.: 1-09-4135
Section: 10+225
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 120 kPa
Friction Angle: 0 deg

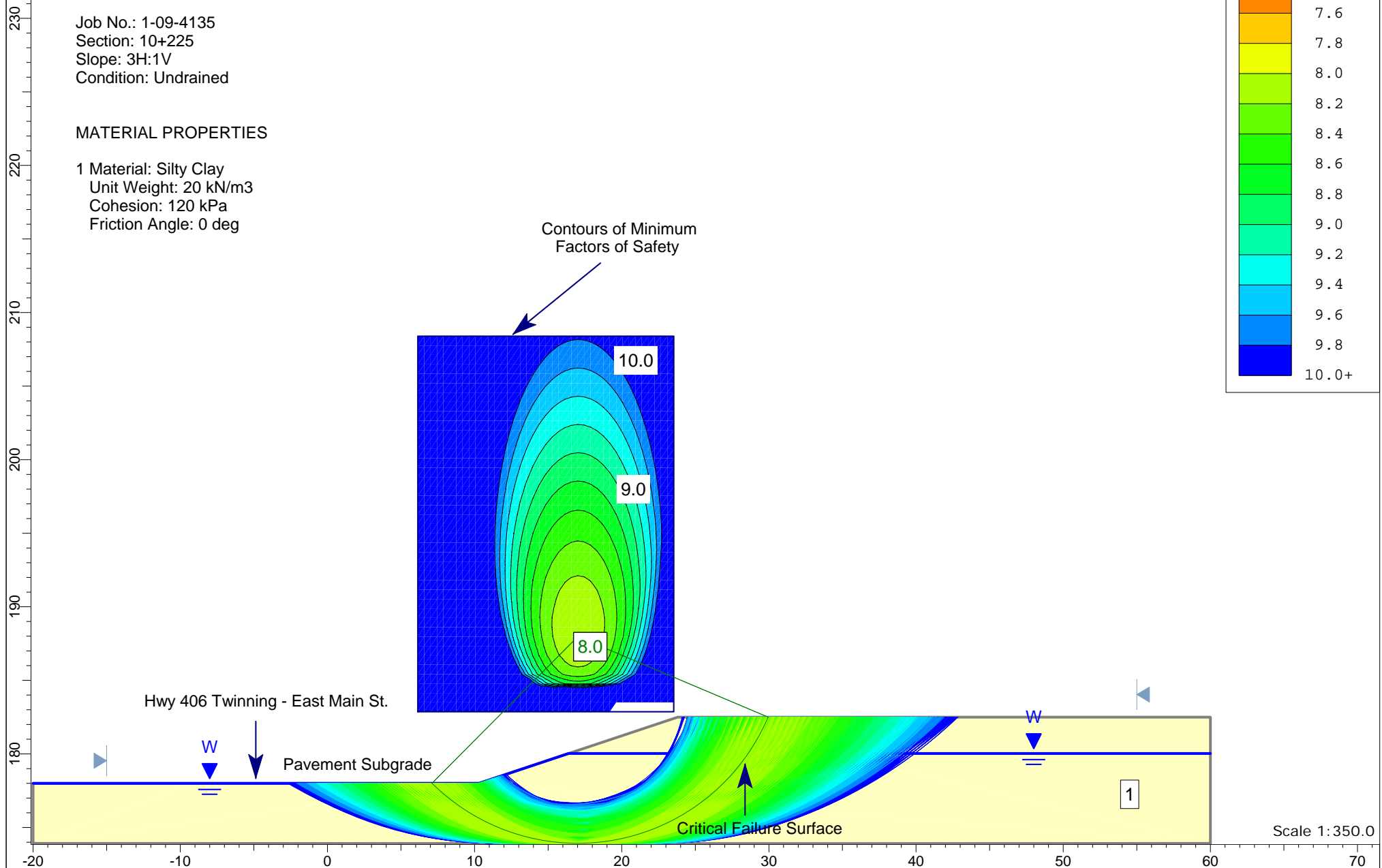
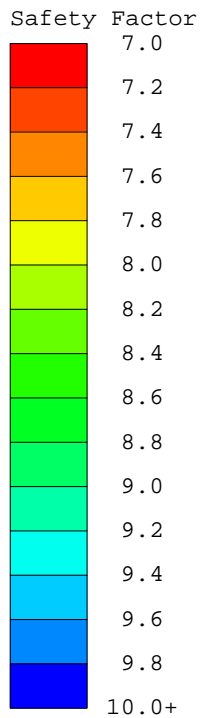


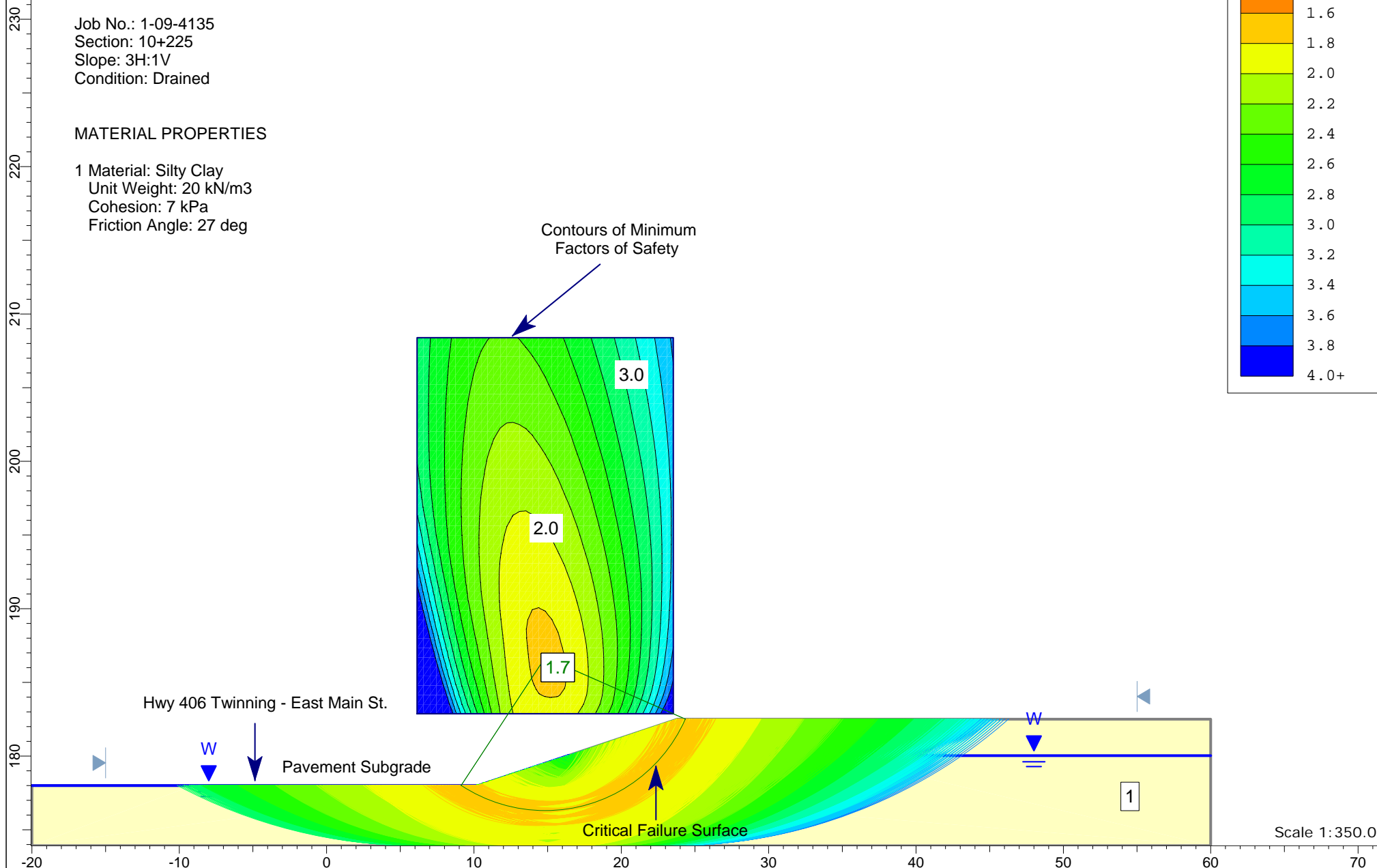
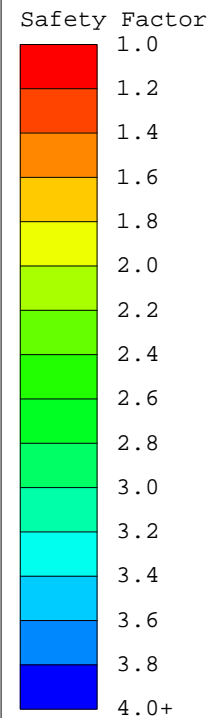
FIGURE 1-5B

Terraprobe

Job No.: 1-09-4135
Section: 10+225
Slope: 3H:1V
Condition: Drained

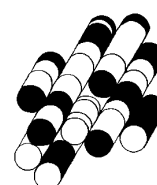
MATERIAL PROPERTIES

1 Material: Silty Clay
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 27 deg



D2

TERRAPROBE INC.



Terraprobe

Job No.: 1-09-4135
Section: SEW 10+050
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

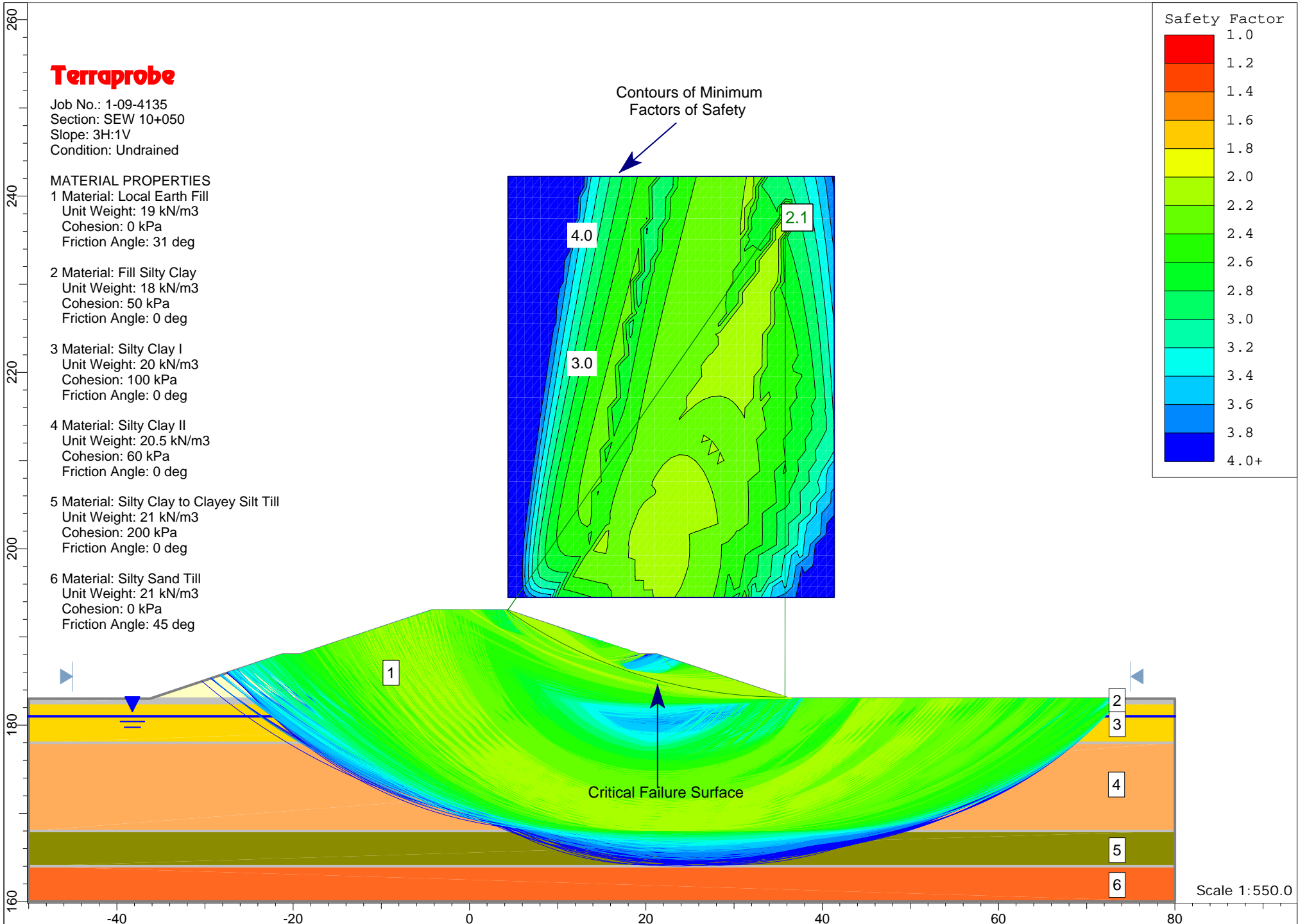
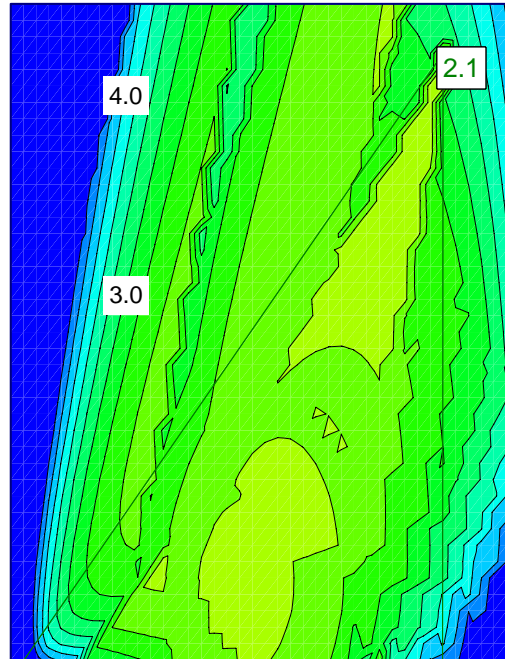
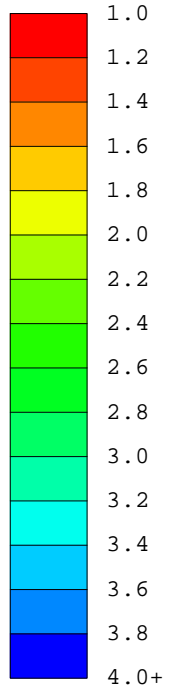
4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg

5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

Safety Factor



Terraprobe

Job No.: 1-09-4135
Section: SEW 10+050
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

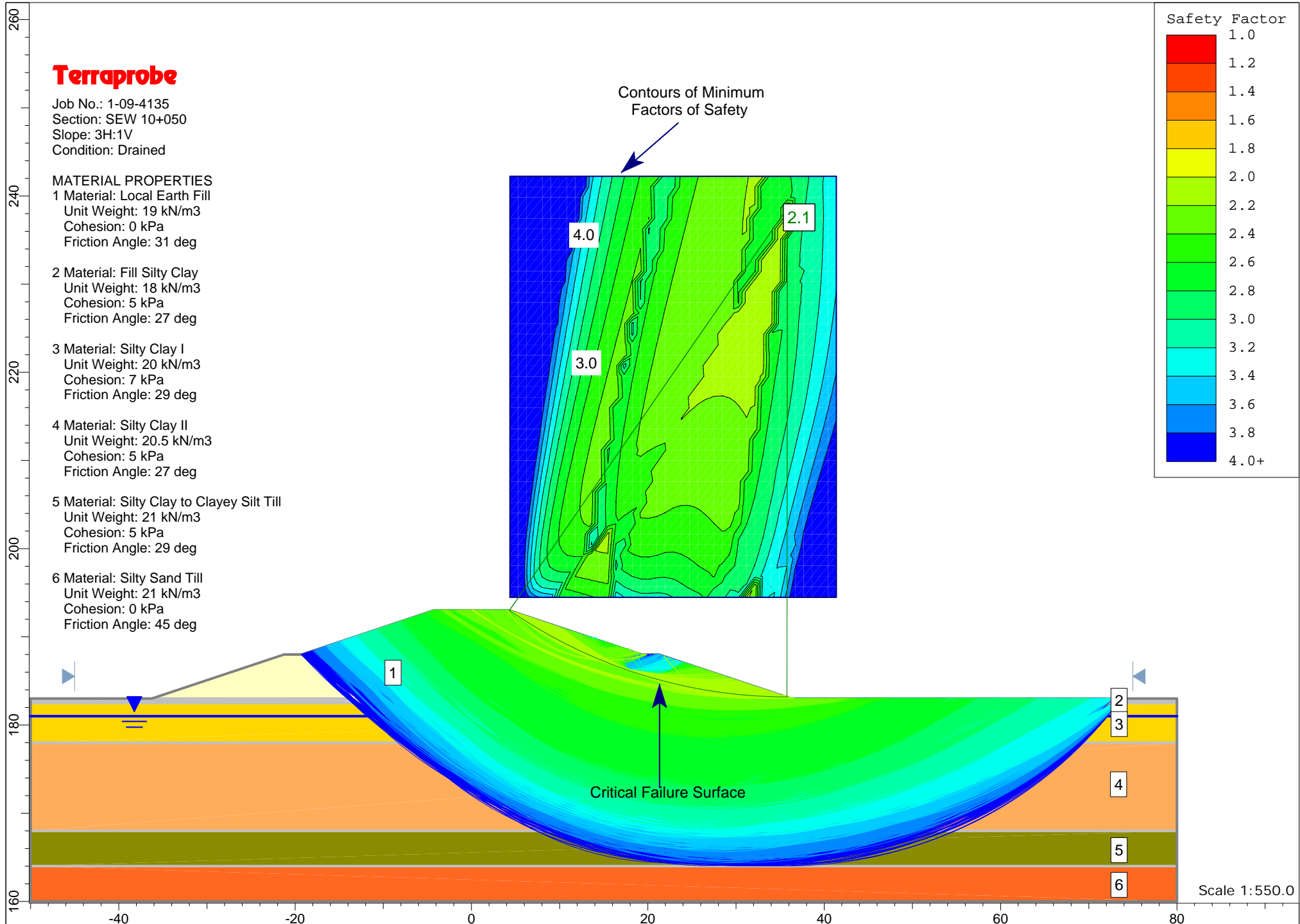
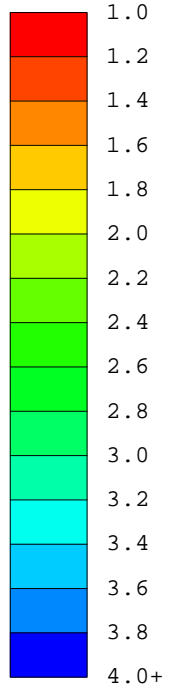
4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

Safety Factor



Terraprobe

Job No.: 1-09-4135
Section: SEW 10+050
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg

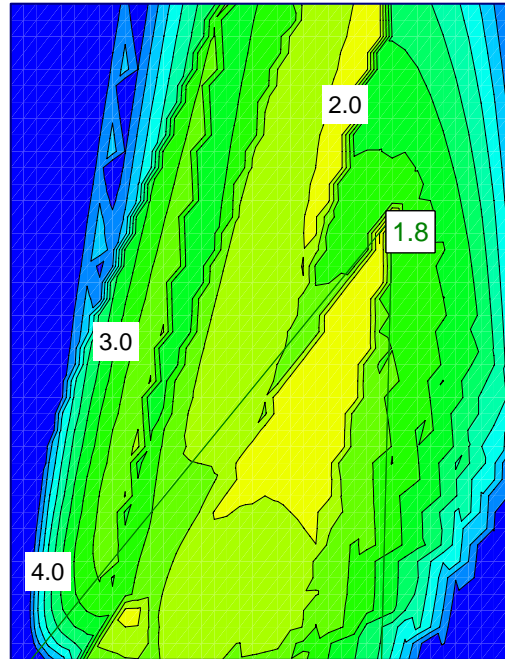
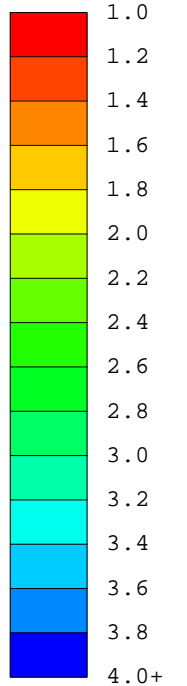
5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Critical Failure Surface

Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SEW 10+050
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

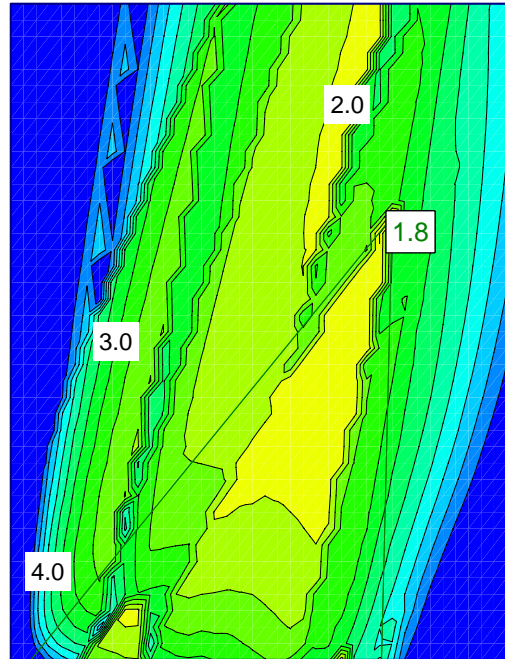
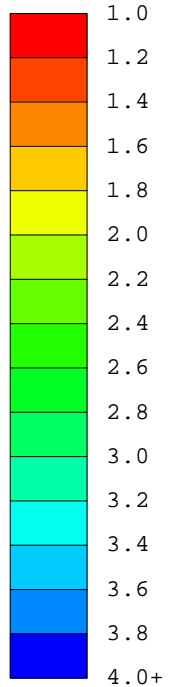
5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Critical Failure Surface

Scale 1:550.0

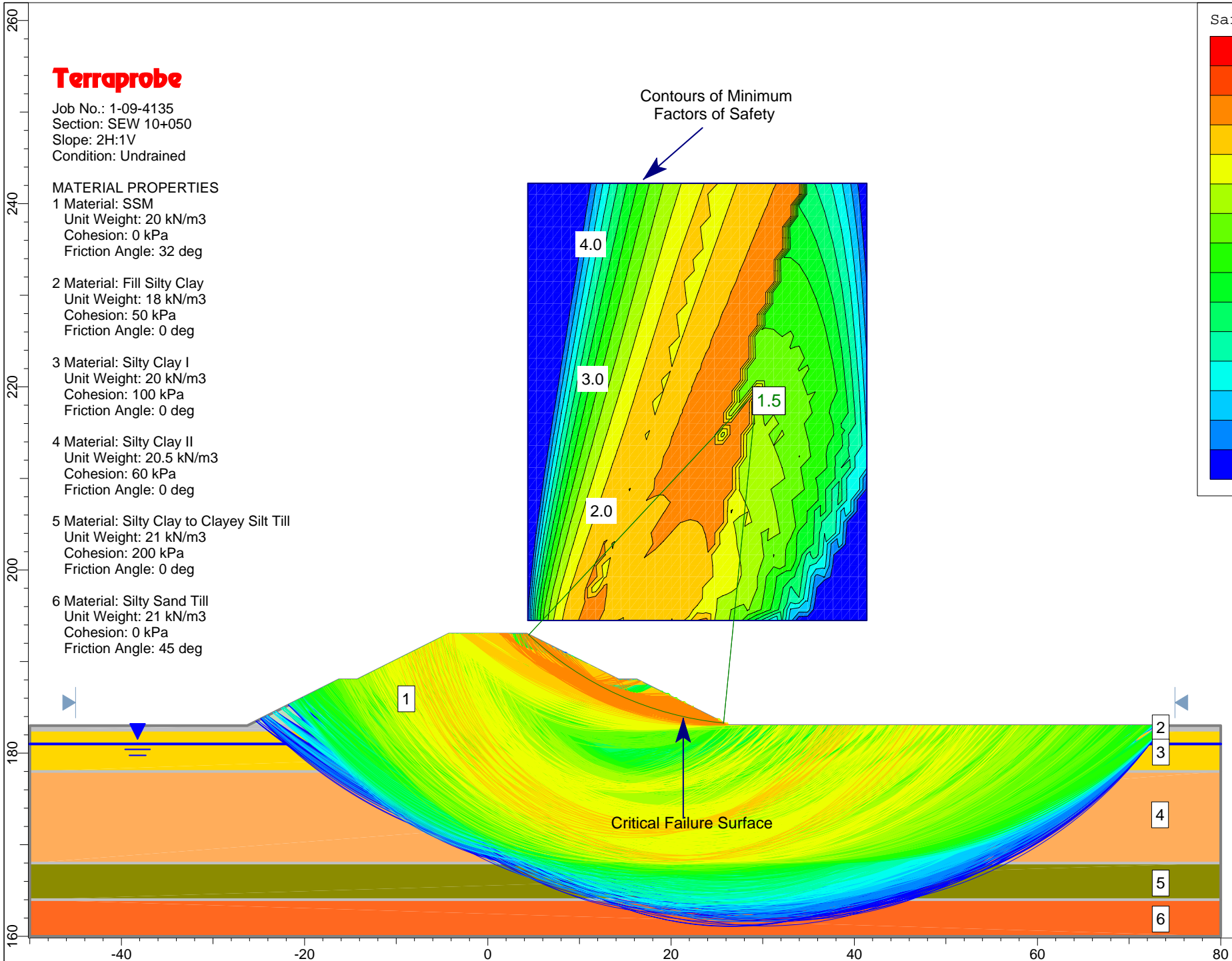
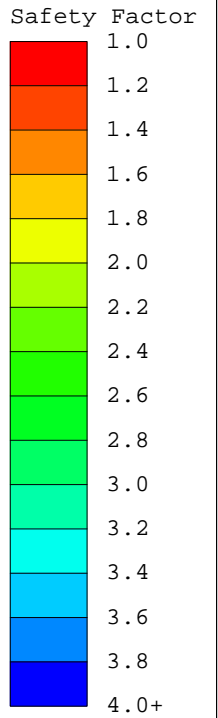
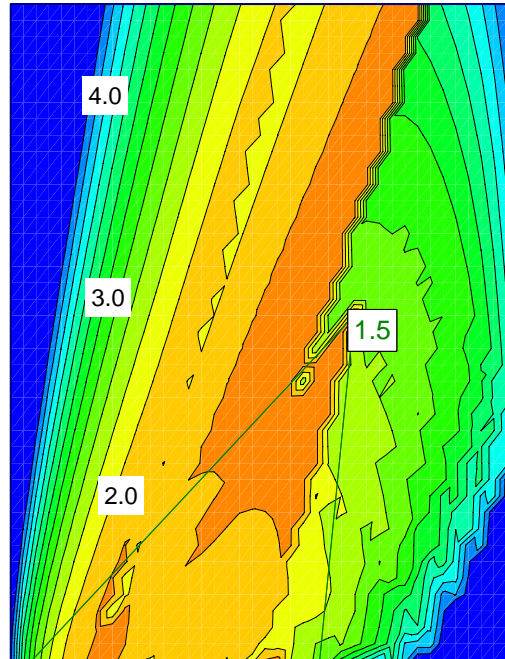
Terraprobe

Job No.: 1-09-4135
Section: SEW 10+050
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

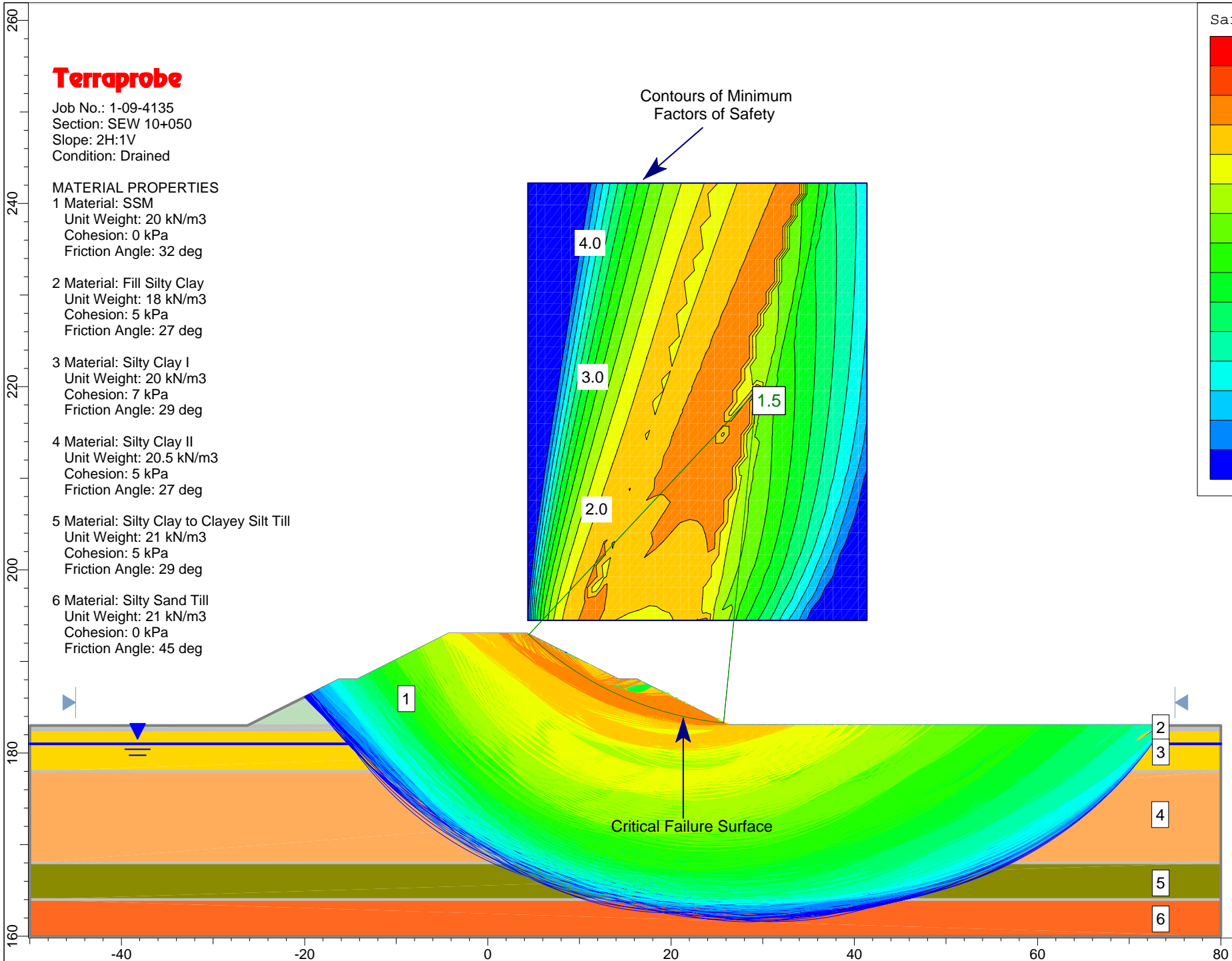
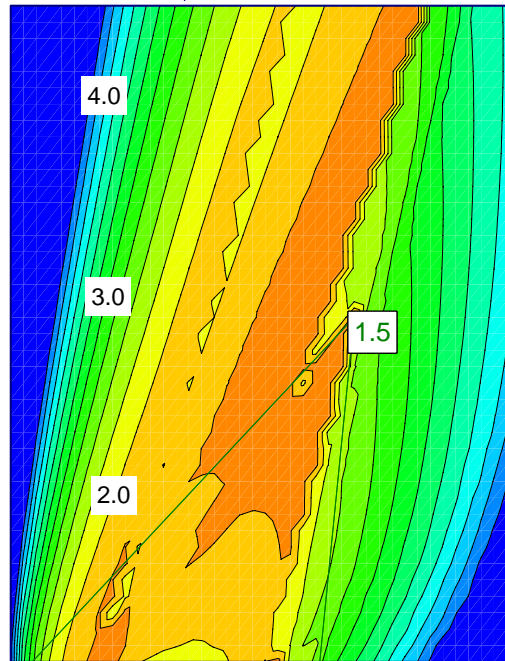
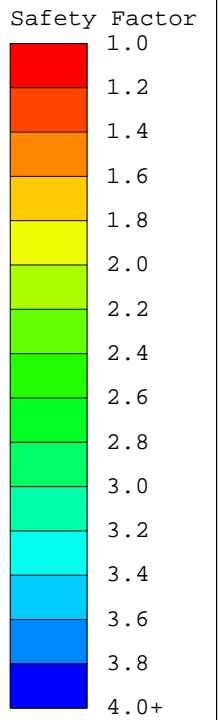
Terraprobe

Job No.: 1-09-4135
Section: SEW 10+050
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



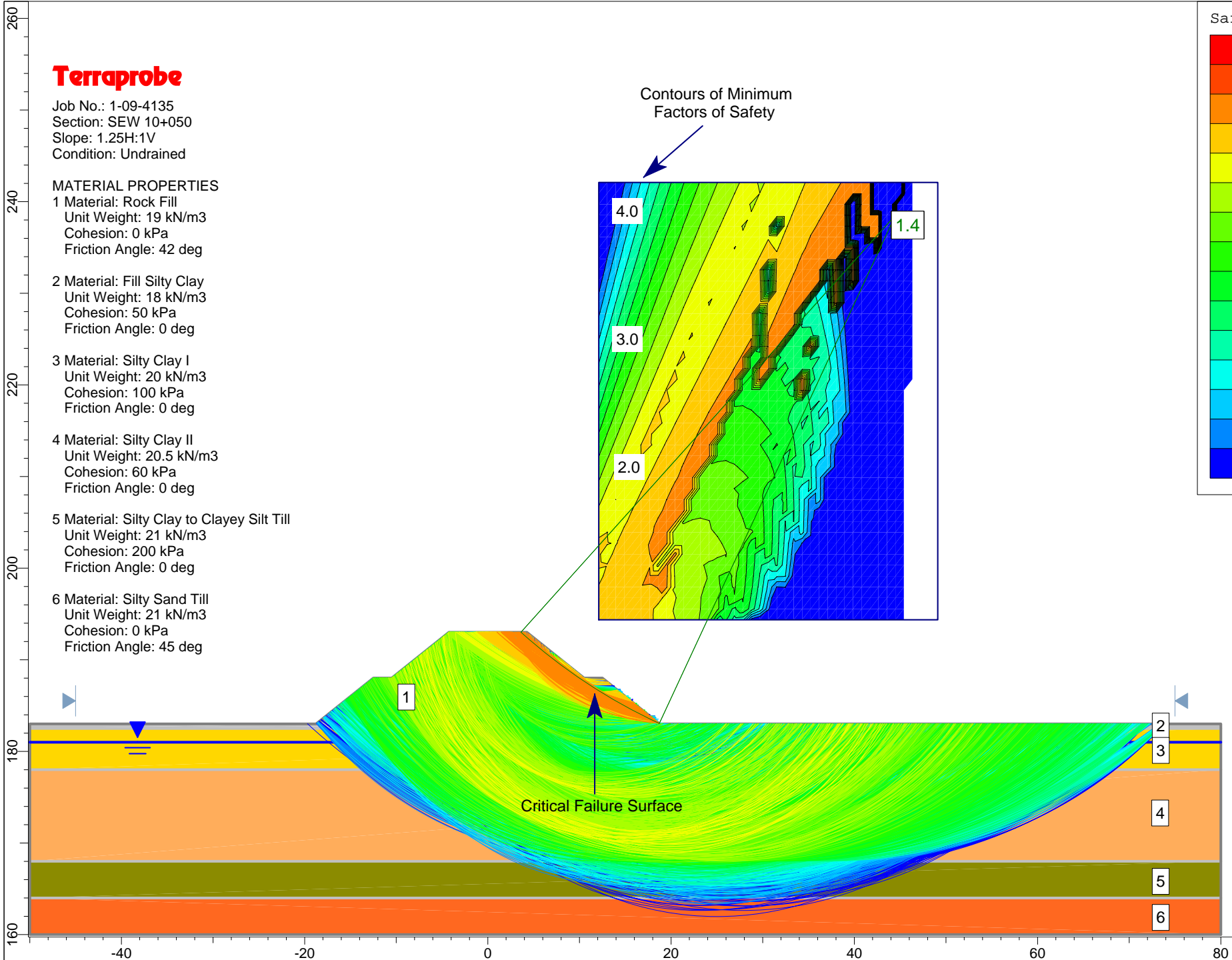
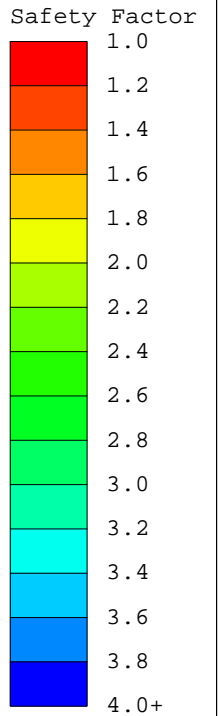
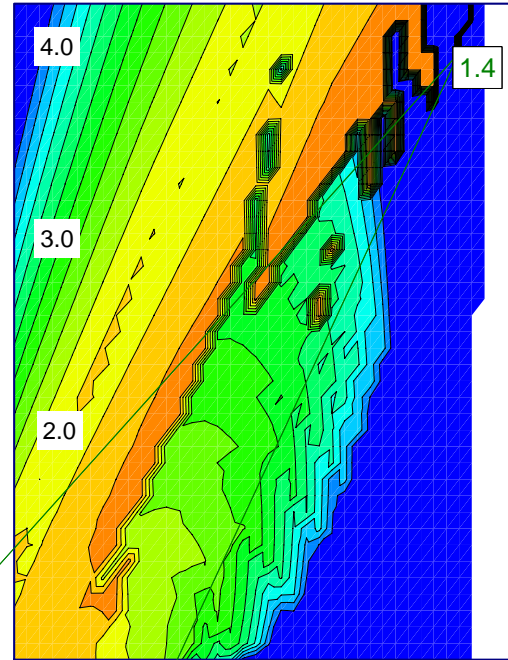
Terraprobe

Job No.: 1-09-4135
Section: SEW 10+050
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

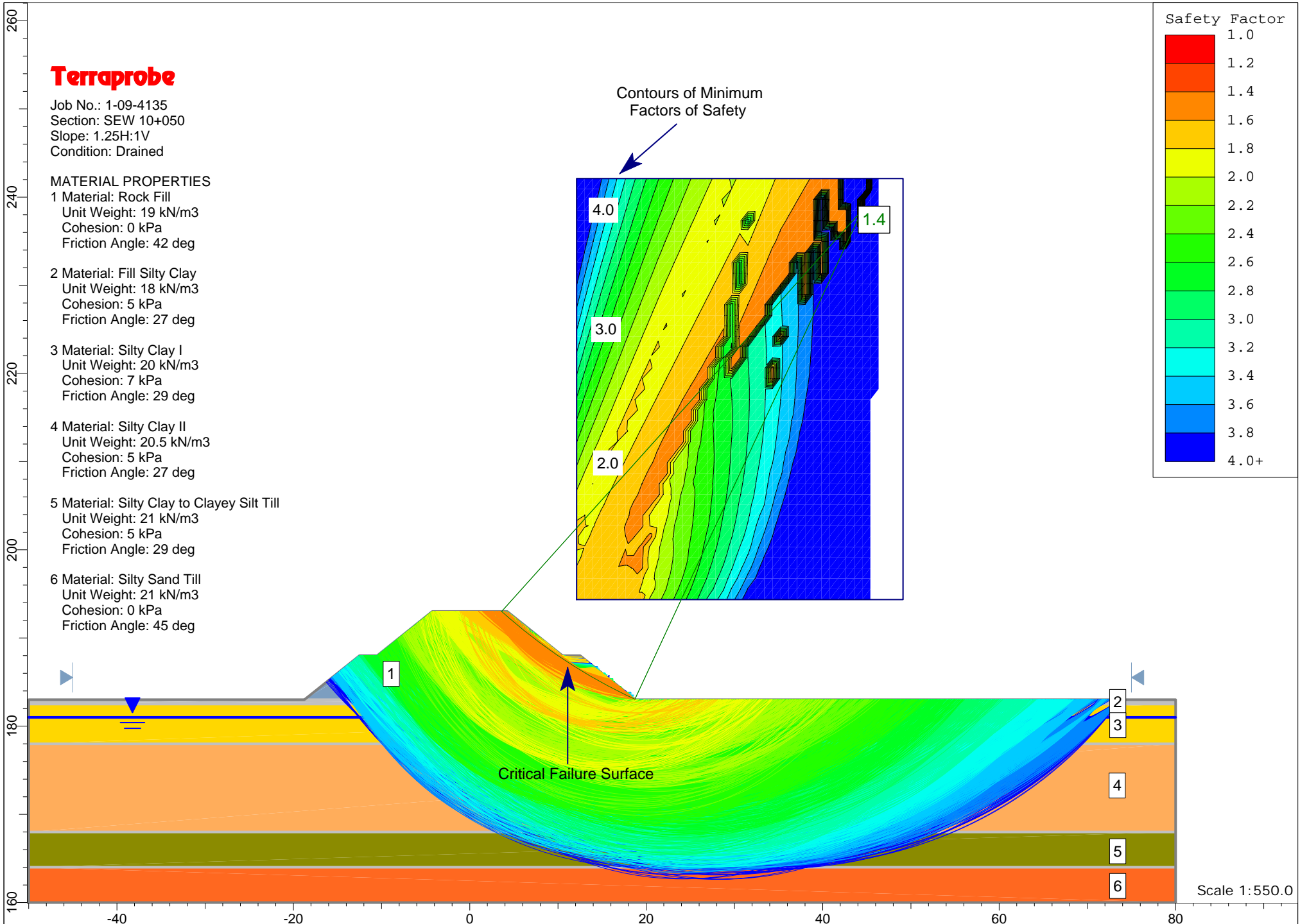
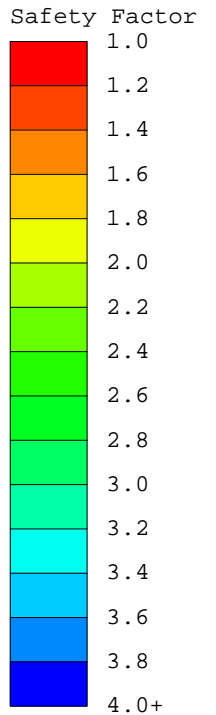
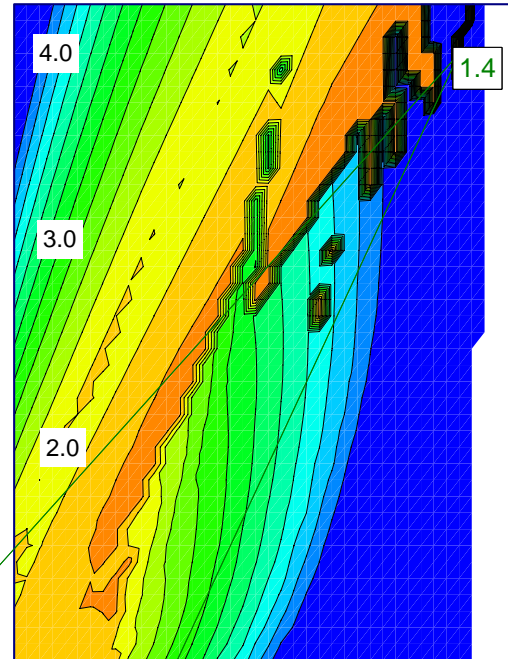
Terraprobe

Job No.: 1-09-4135
Section: SEW 10+050
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



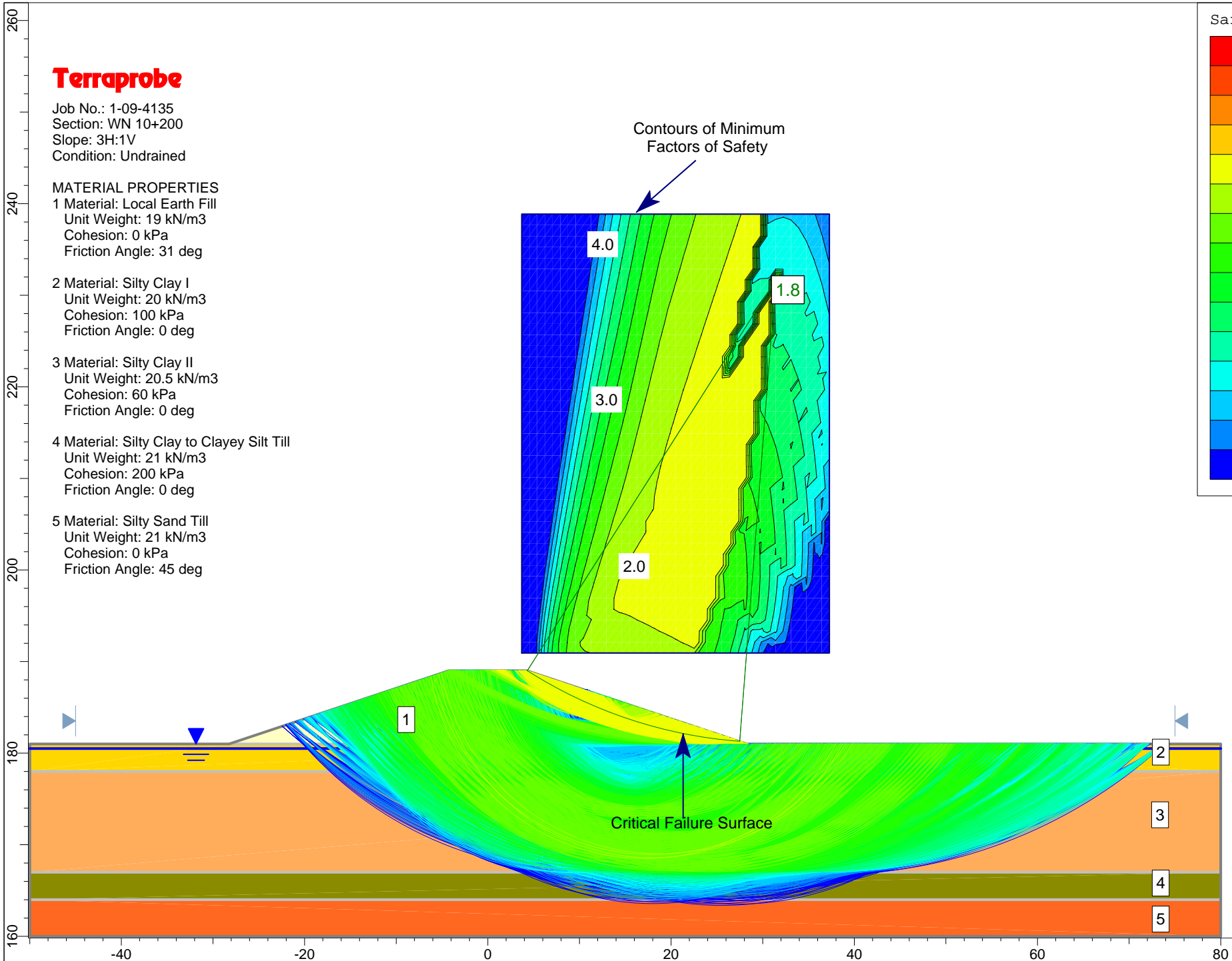
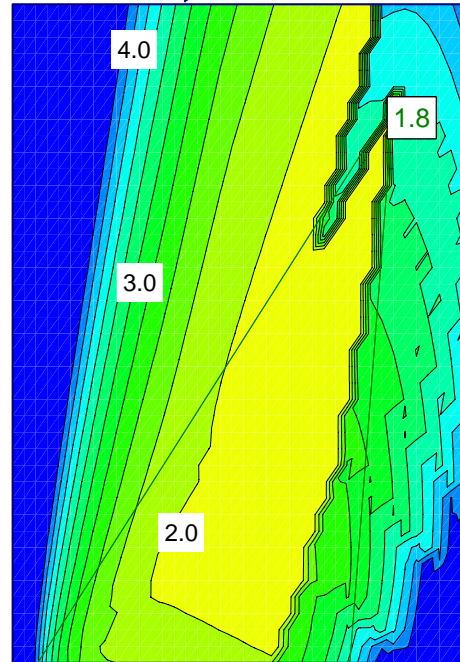
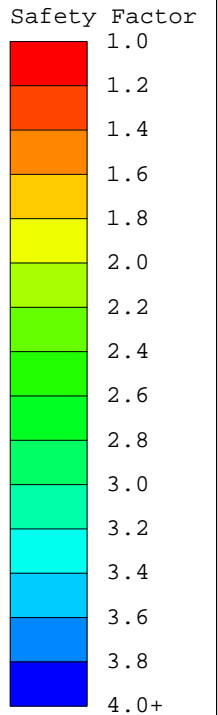
Terraprobe

Job No.: 1-09-4135
Section: WN 10+200
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 5 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



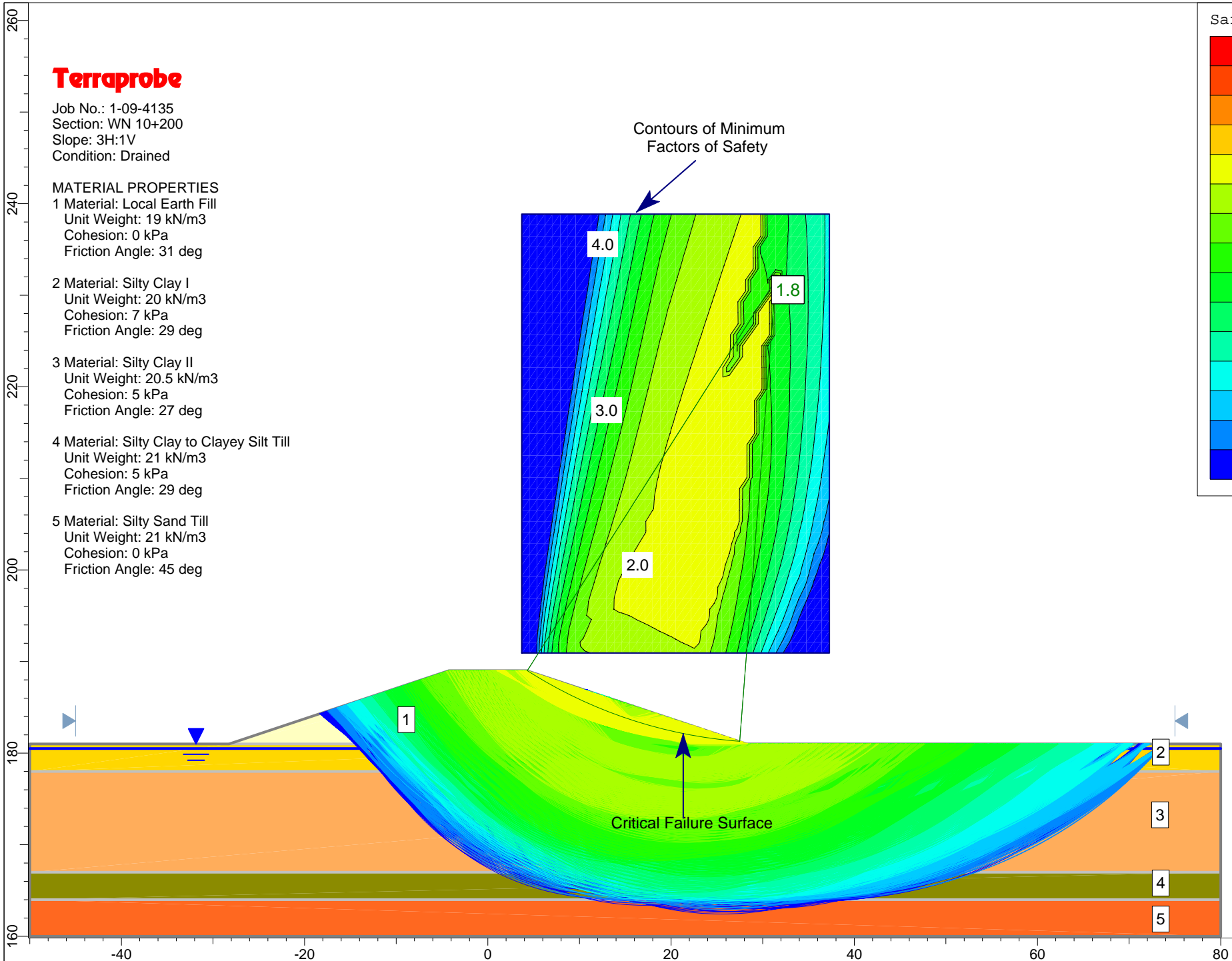
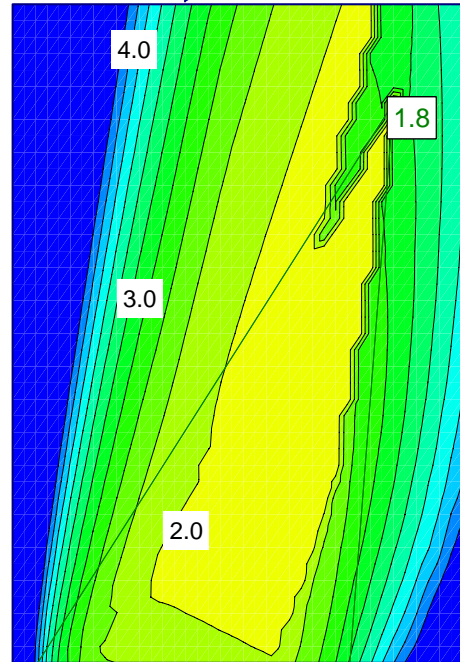
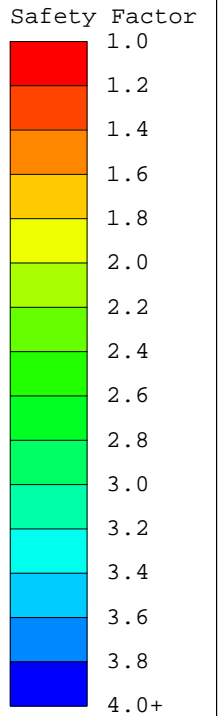
Terraprobe

Job No.: 1-09-4135
Section: WN 10+200
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 5 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



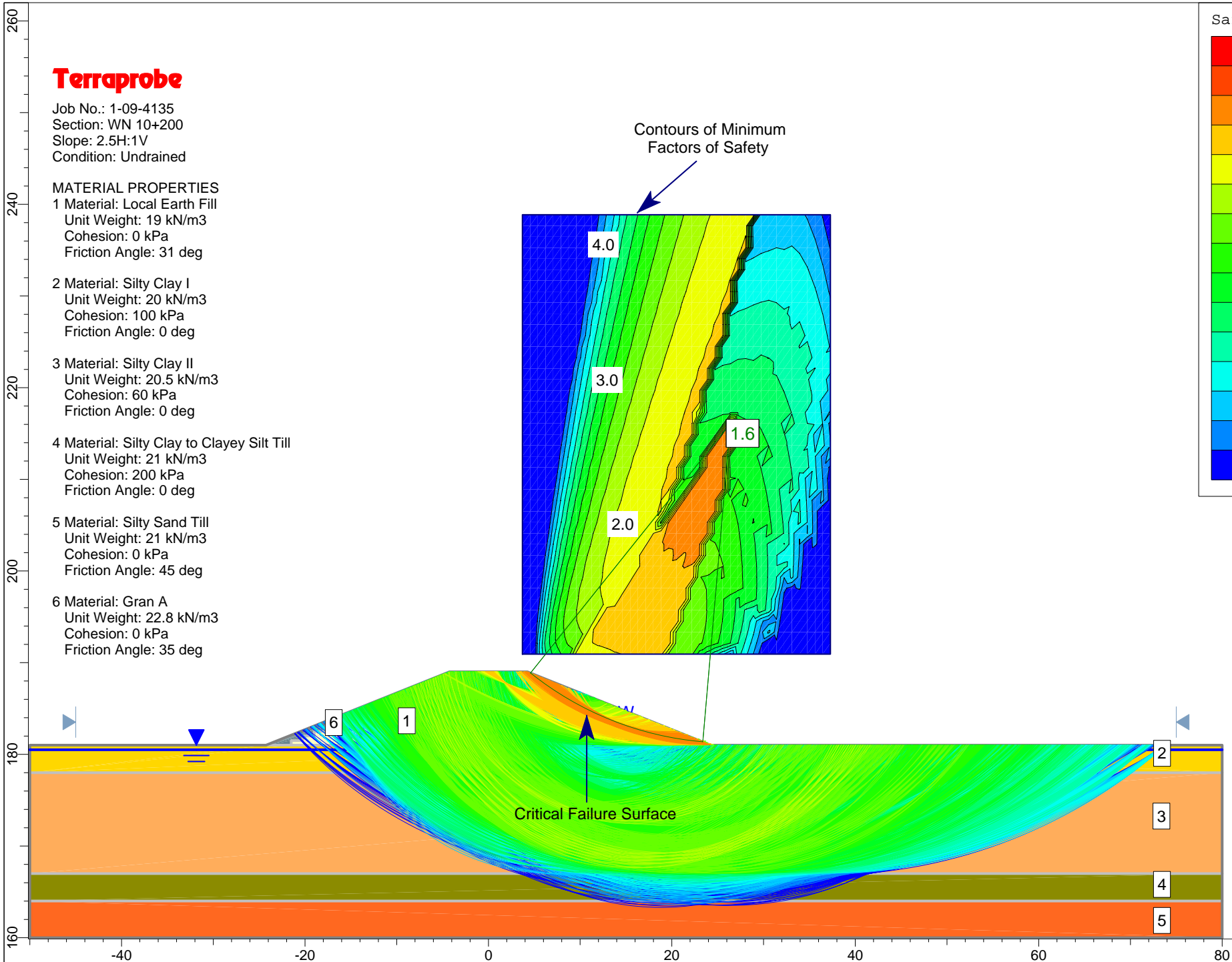
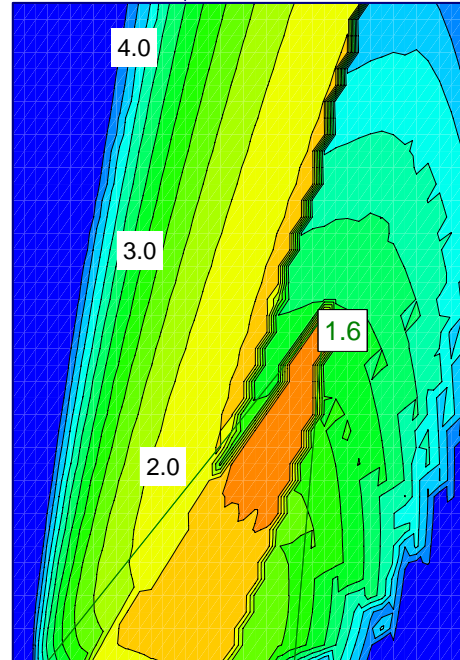
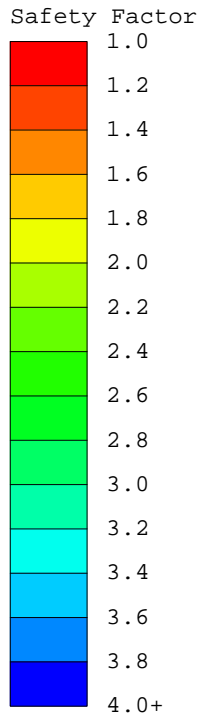
Terraprobe

Job No.: 1-09-4135
Section: WN 10+200
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 5 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg
- 6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

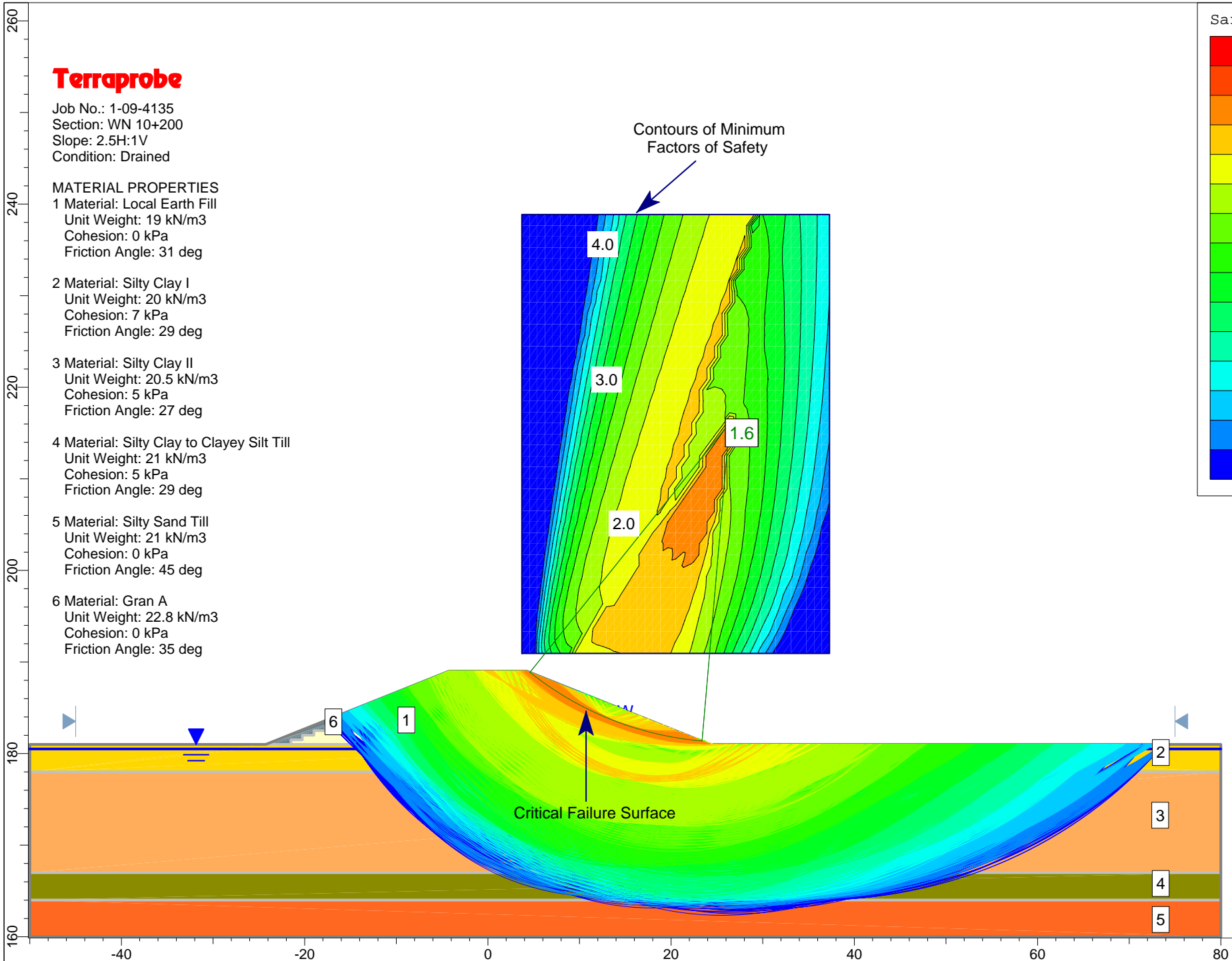
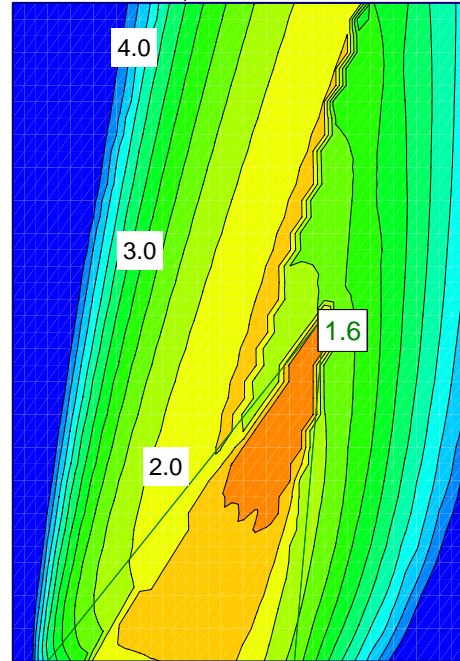
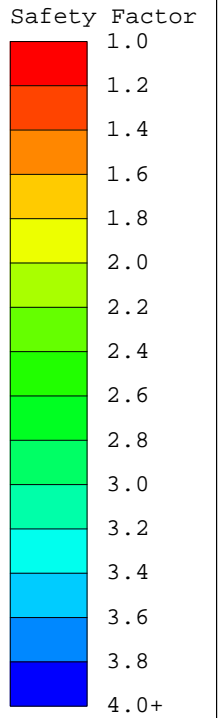
Terraprobe

Job No.: 1-09-4135
Section: WN 10+200
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 5 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg
- 6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

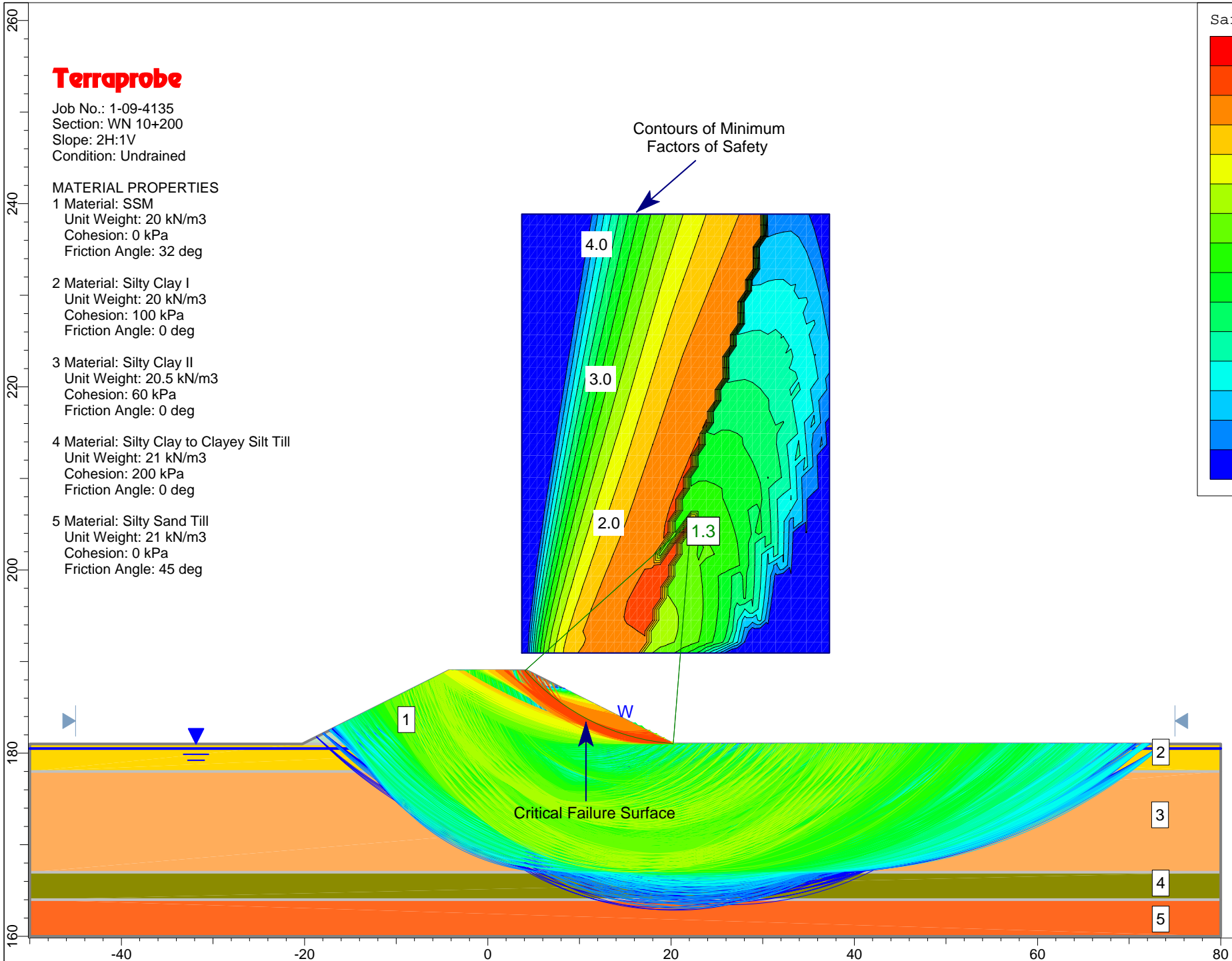
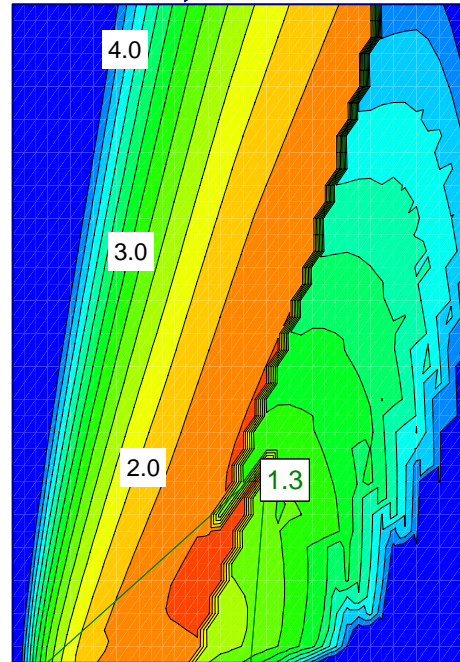
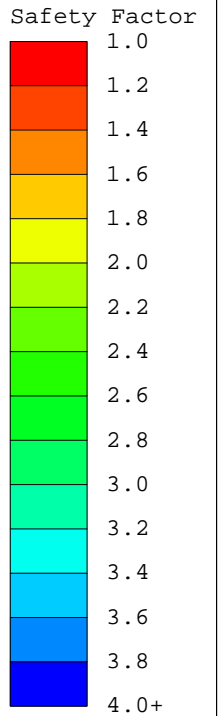
Terraprobe

Job No.: 1-09-4135
Section: WN 10+200
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 5 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

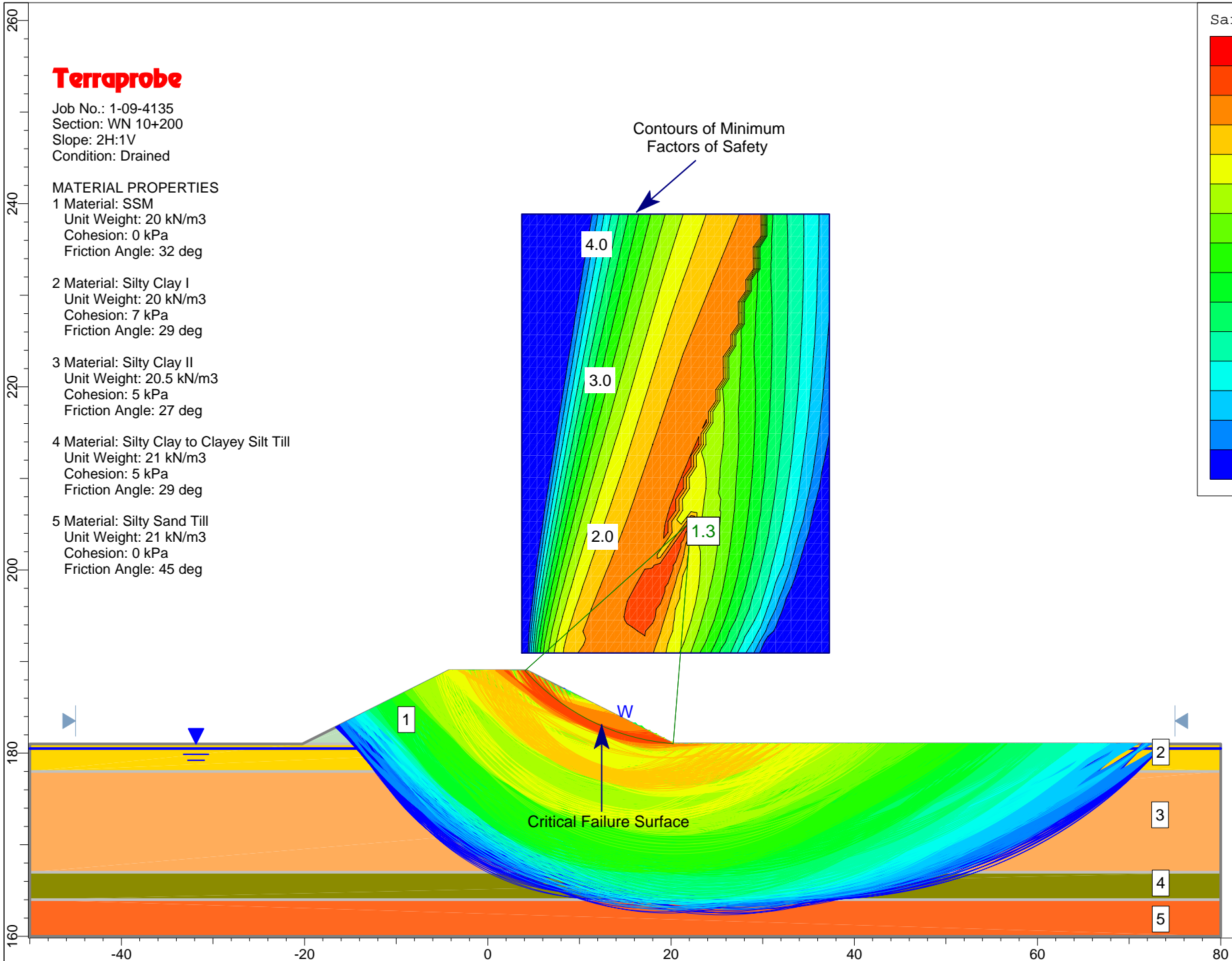
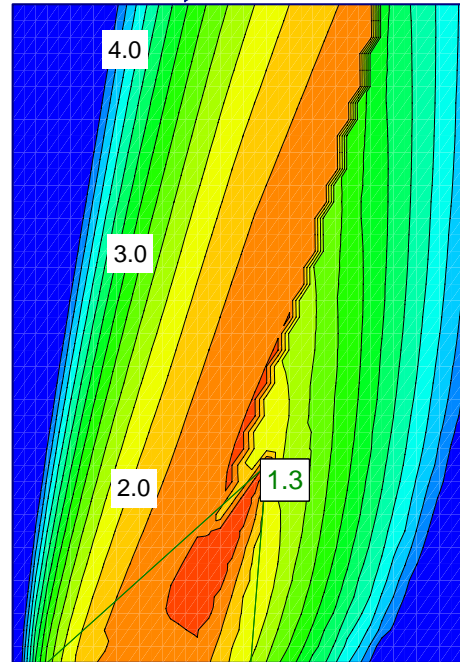
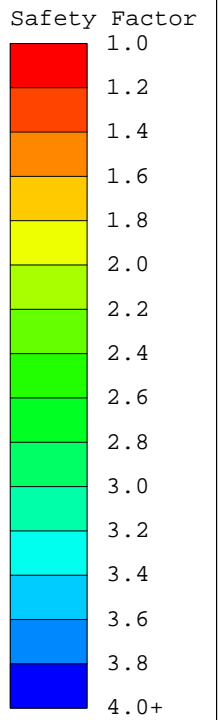
Terraprobe

Job No.: 1-09-4135
Section: WN 10+200
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 5 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



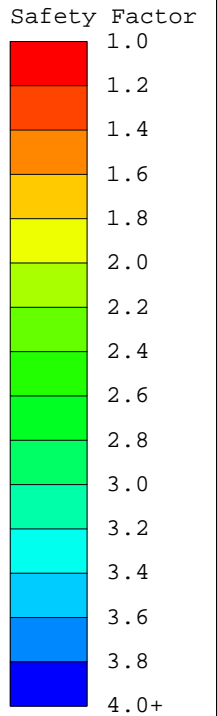
Scale 1:550.0

Terraprobe

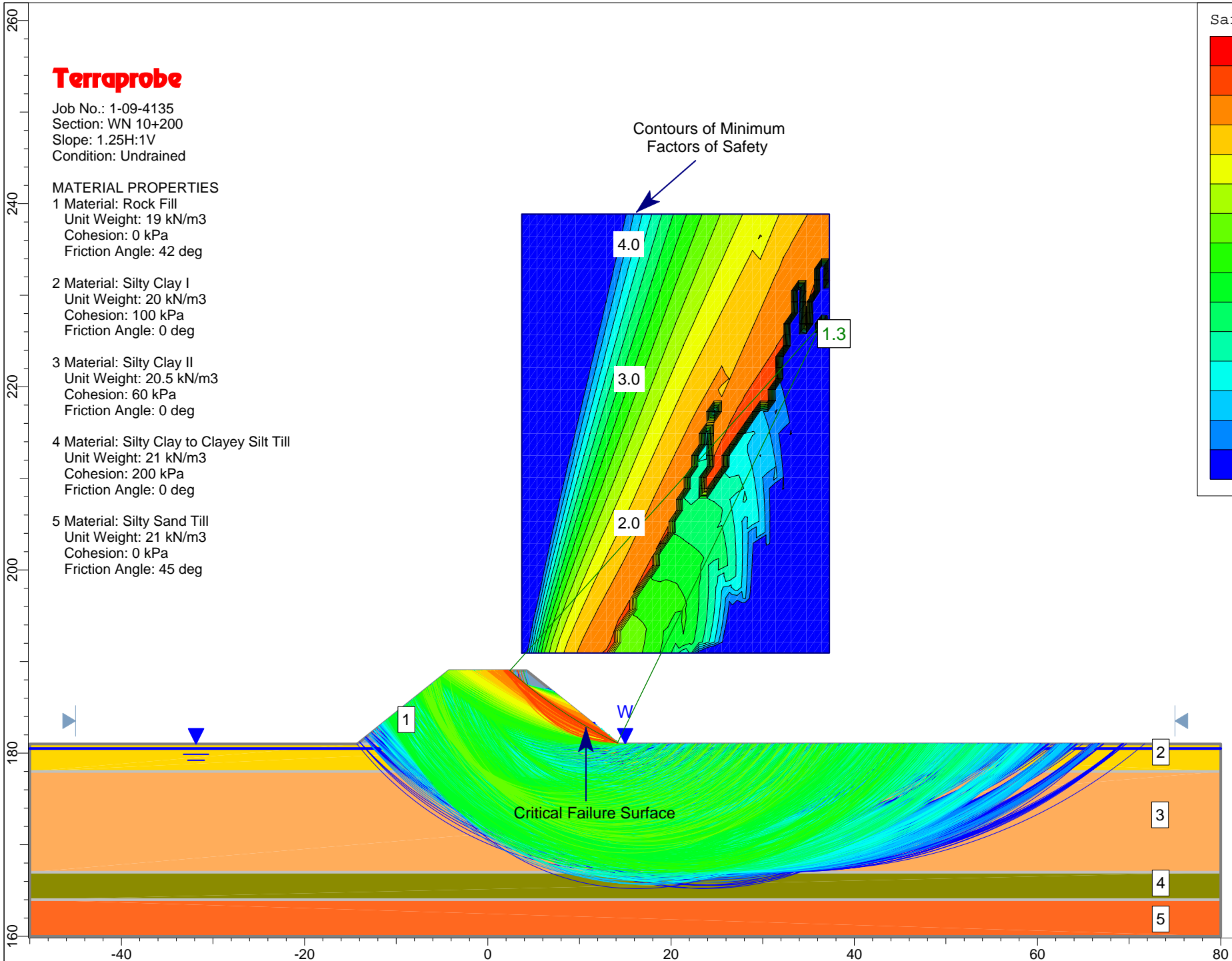
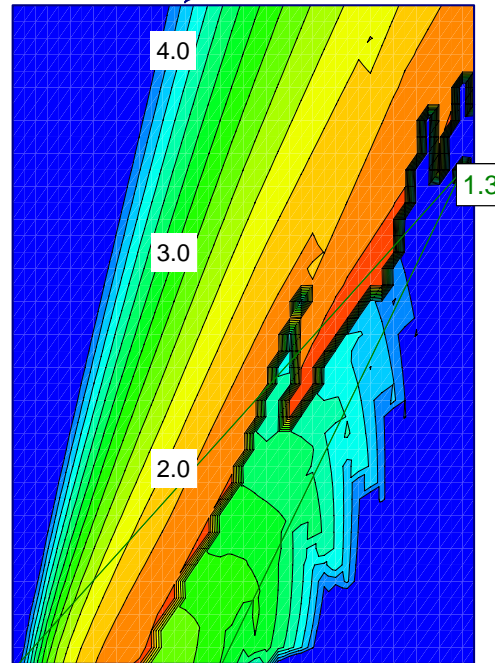
Job No.: 1-09-4135
Section: WN 10+200
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 5 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum Factors of Safety



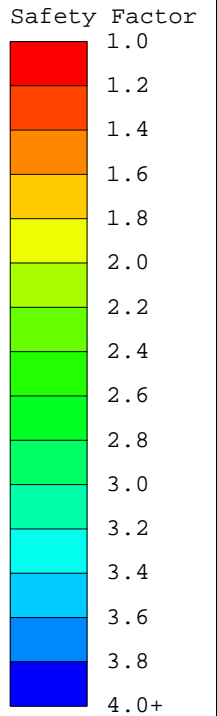
Scale 1:550.0

Terraprobe

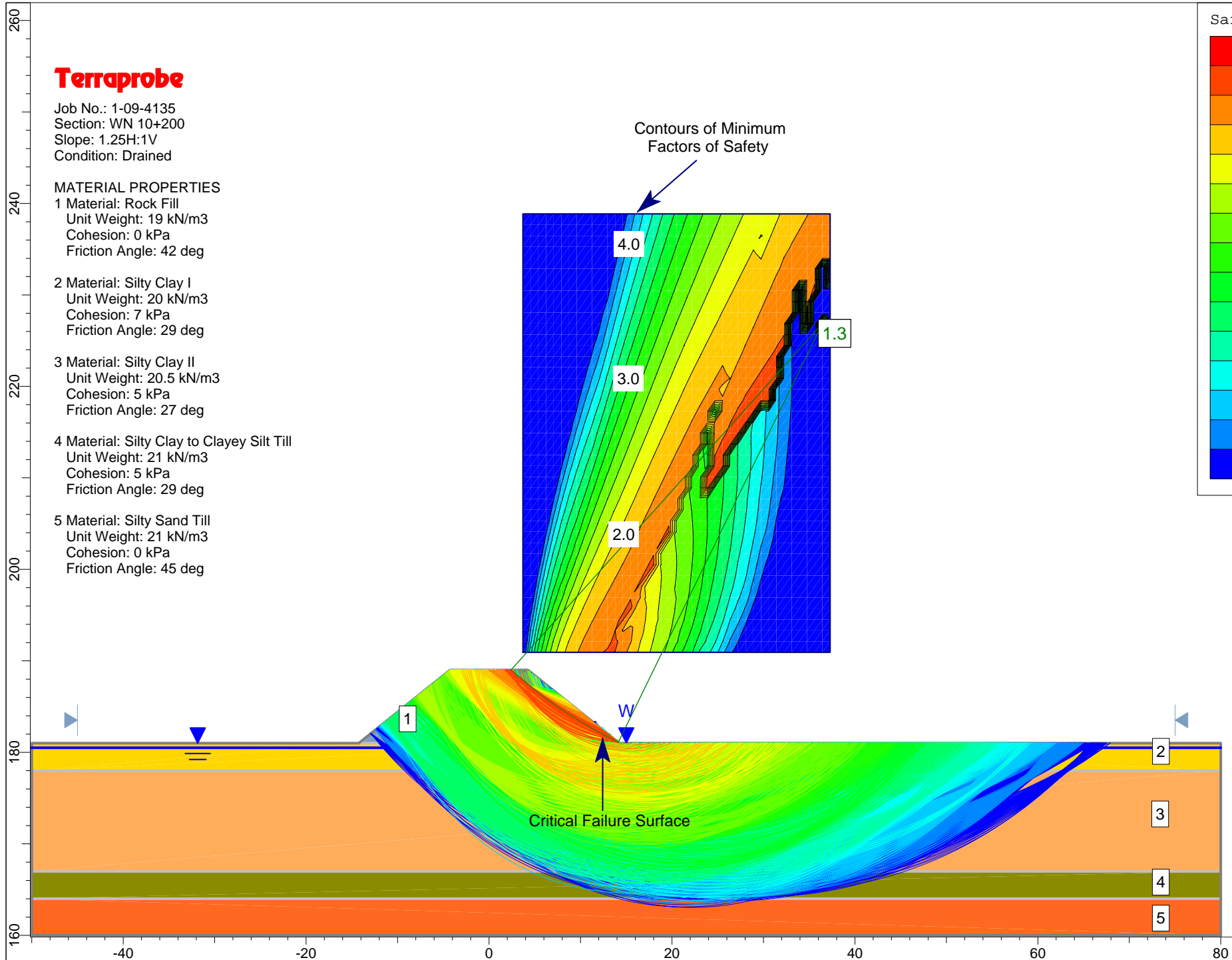
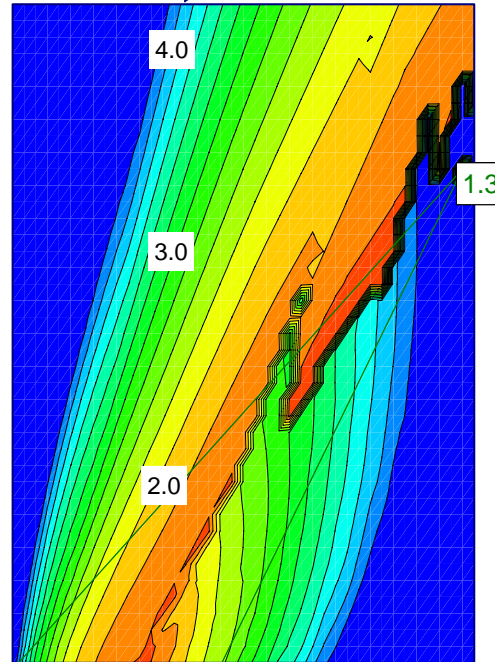
Job No.: 1-09-4135
Section: WN 10+200
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 5 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum
Factors of Safety



Scale 1:550.0

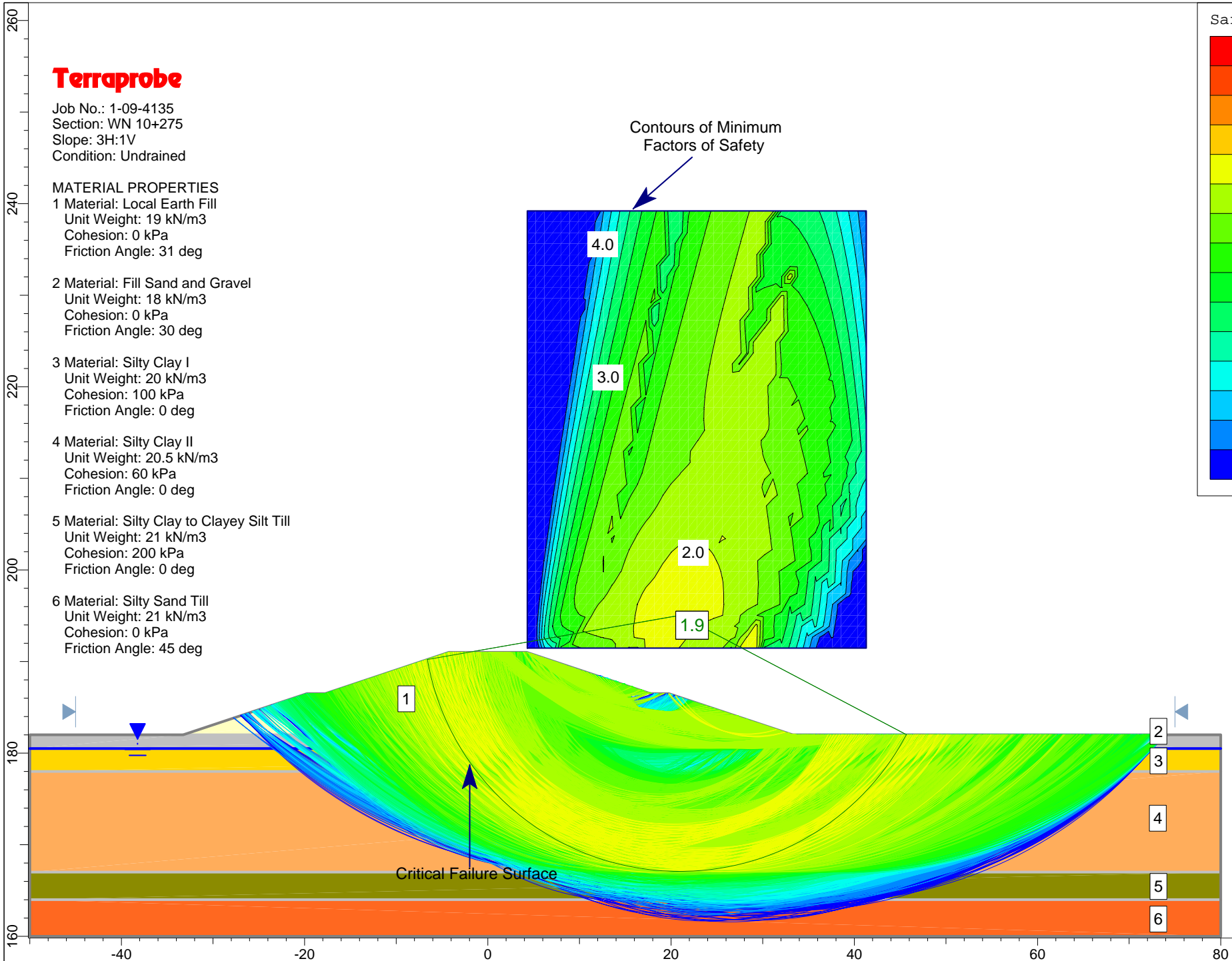
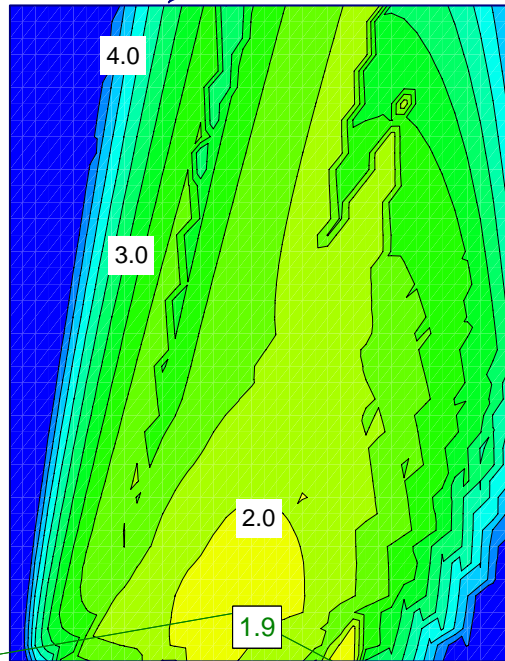
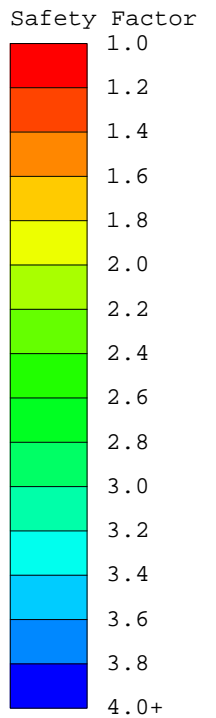
Terraprobe

Job No.: 1-09-4135
Section: WN 10+275
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Sand and Gravel
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Friction Angle: 30 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

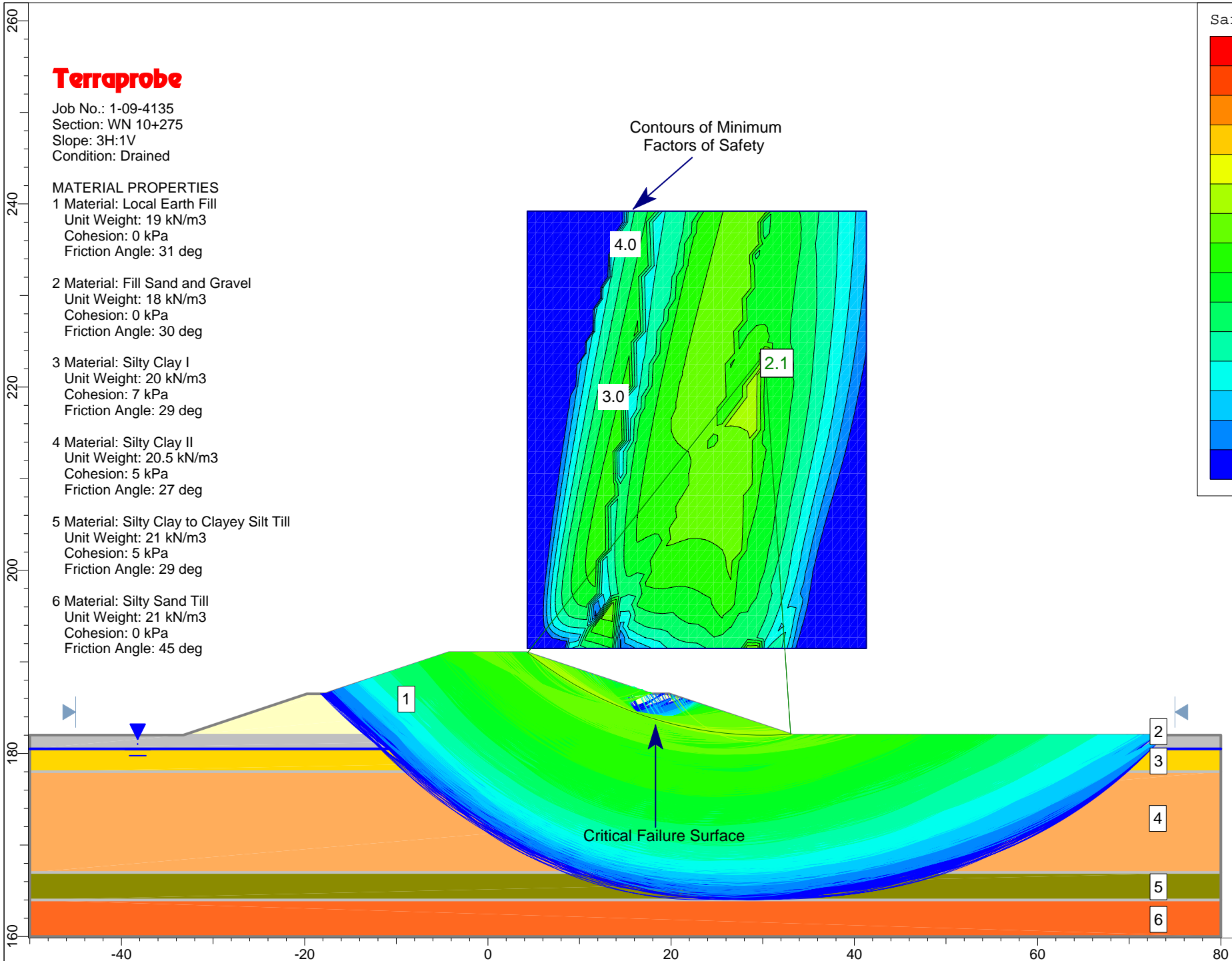
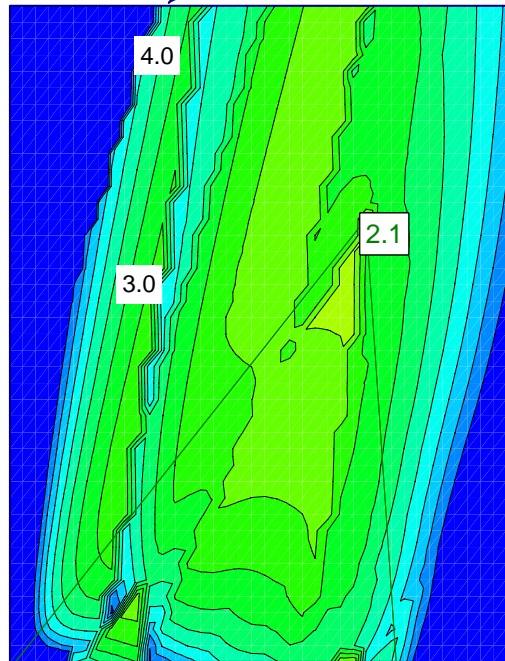
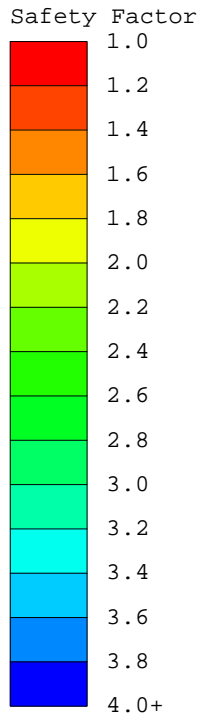
Terraprobe

Job No.: 1-09-4135
Section: WN 10+275
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Sand and Gravel
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Friction Angle: 30 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

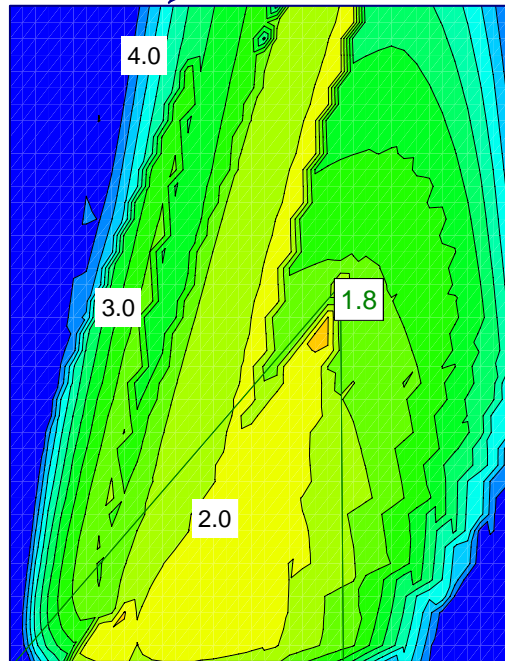
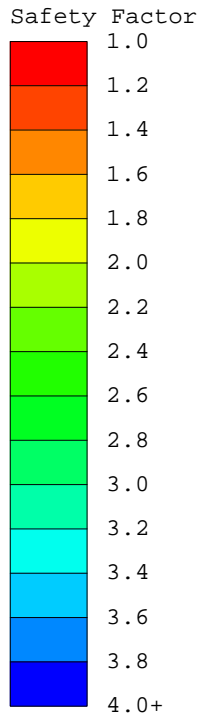
Terraprobe

Job No.: 1-09-4135
Section: WN 10+275
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Sand and Gravel
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Friction Angle: 30 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg
- 7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

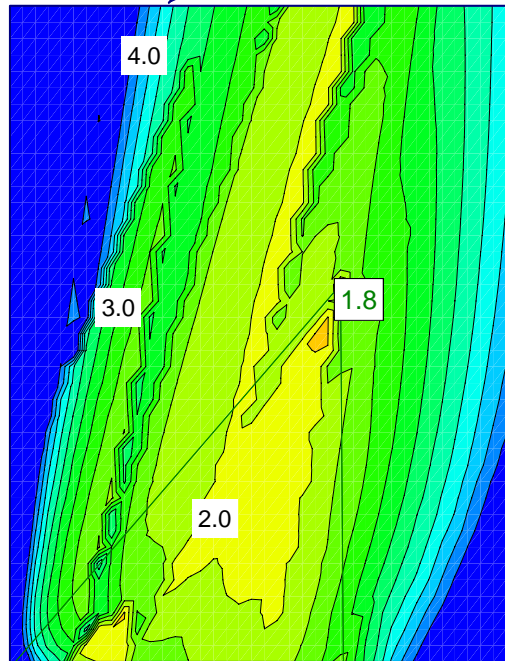
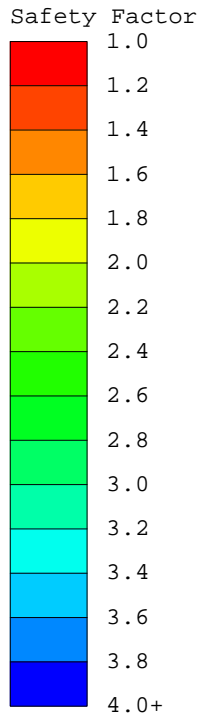
Terraprobe

Job No.: 1-09-4135
Section: WN 10+275
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Sand and Gravel
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Friction Angle: 30 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg
- 7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

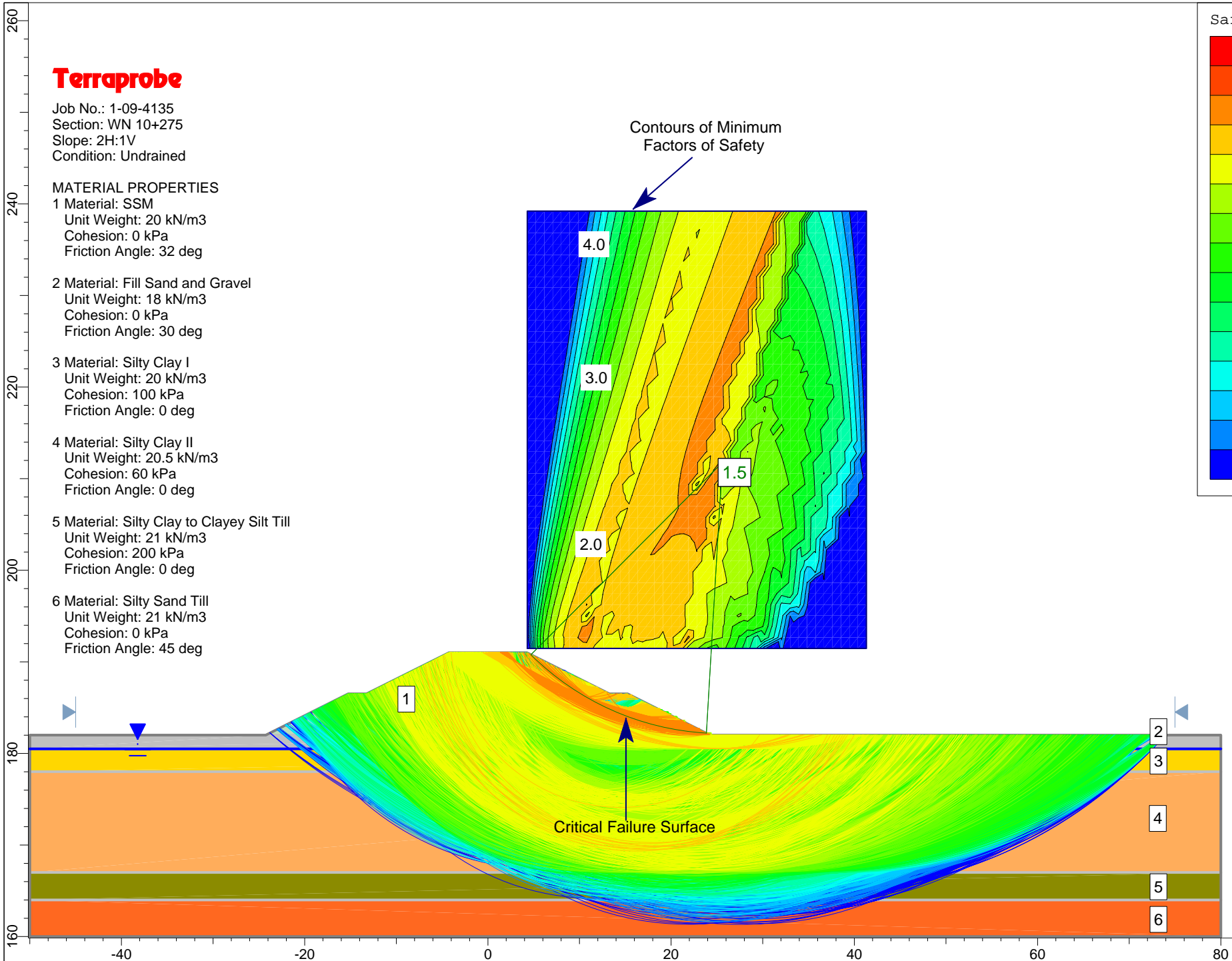
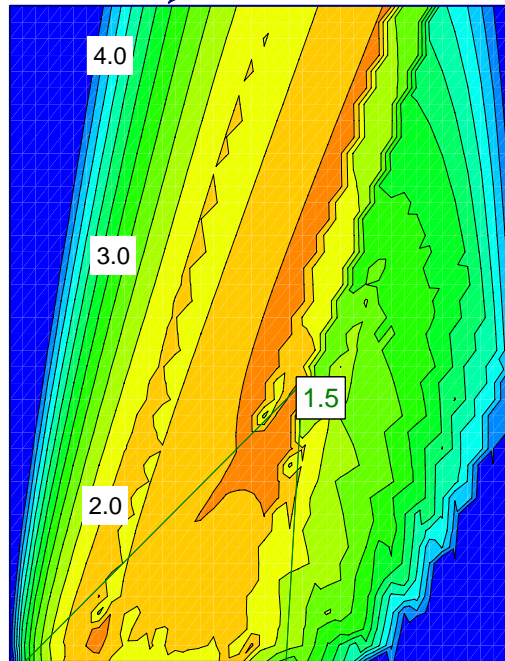
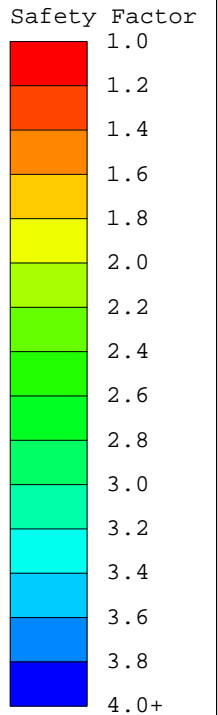
Terraprobe

Job No.: 1-09-4135
Section: WN 10+275
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Sand and Gravel
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Friction Angle: 30 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



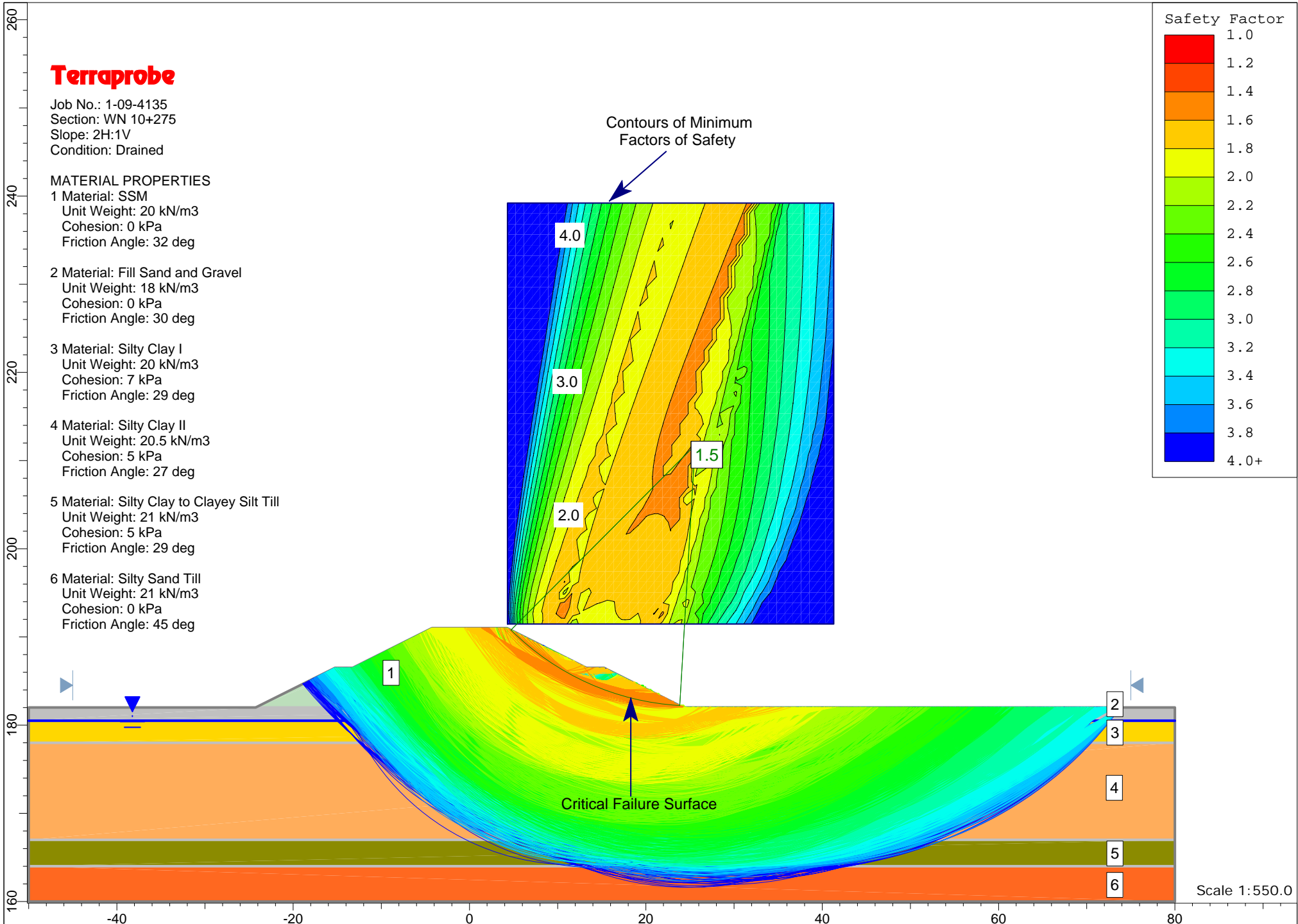
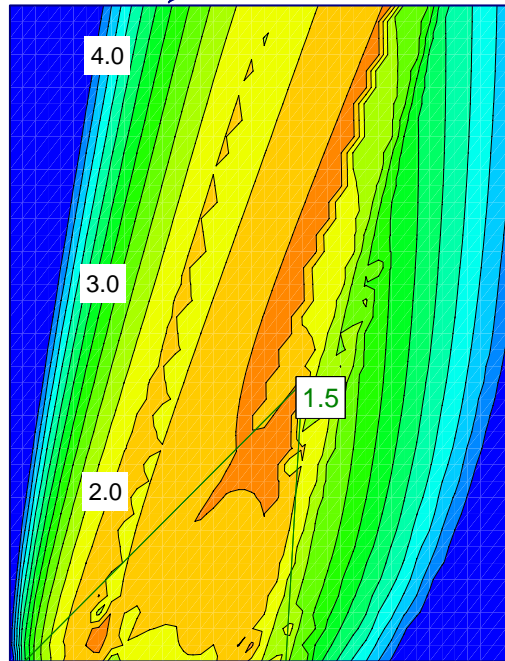
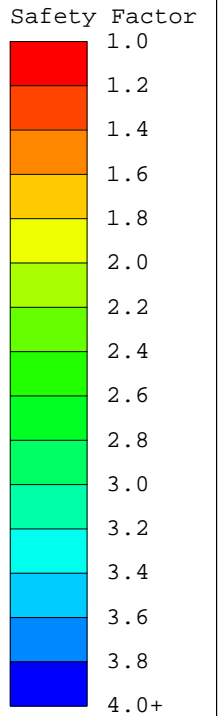
Terraprobe

Job No.: 1-09-4135
Section: WN 10+275
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Sand and Gravel
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Friction Angle: 30 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

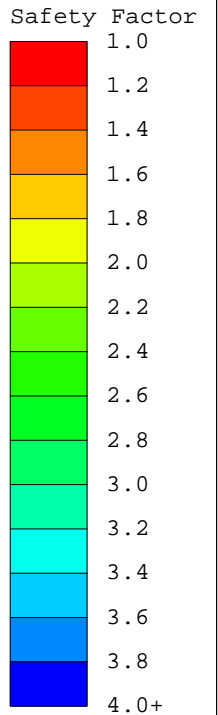


Terraprobe

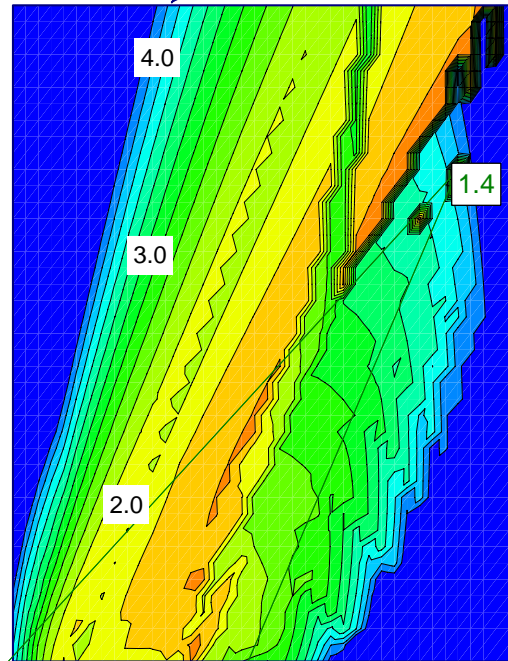
Job No.: 1-09-4135
Section: WN 10+275
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Sand and Gravel
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Friction Angle: 30 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

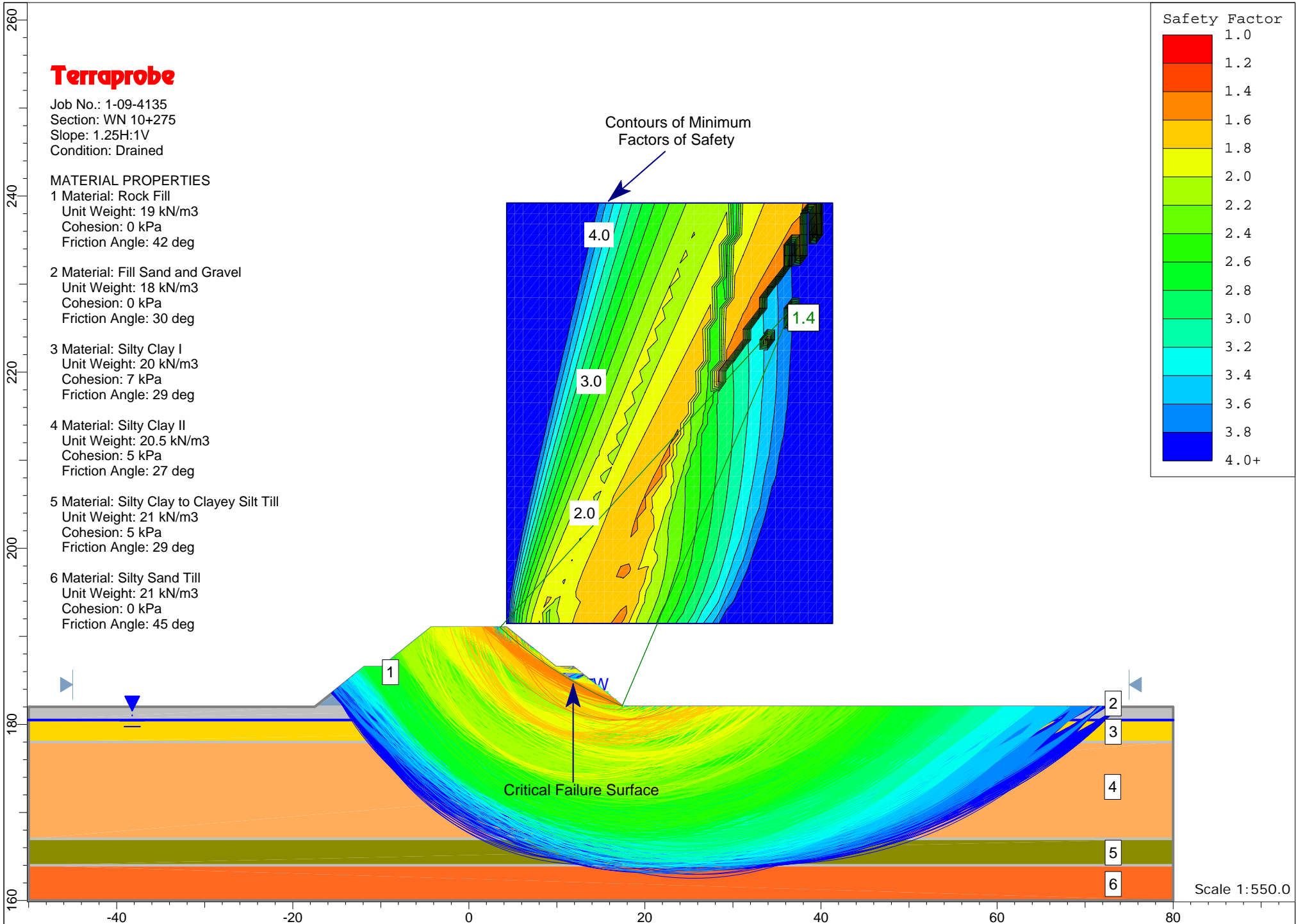
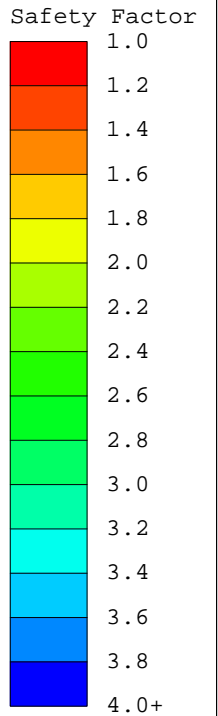
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Terraprobe

Job No.: 1-09-4135
Section: WN 10+275
Slope: 1.25H:1V
Condition: Drained

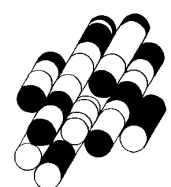
MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Sand and Gravel
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Friction Angle: 30 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay to Clayey Silt Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Silty Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



D3

TERRAPROBE INC.



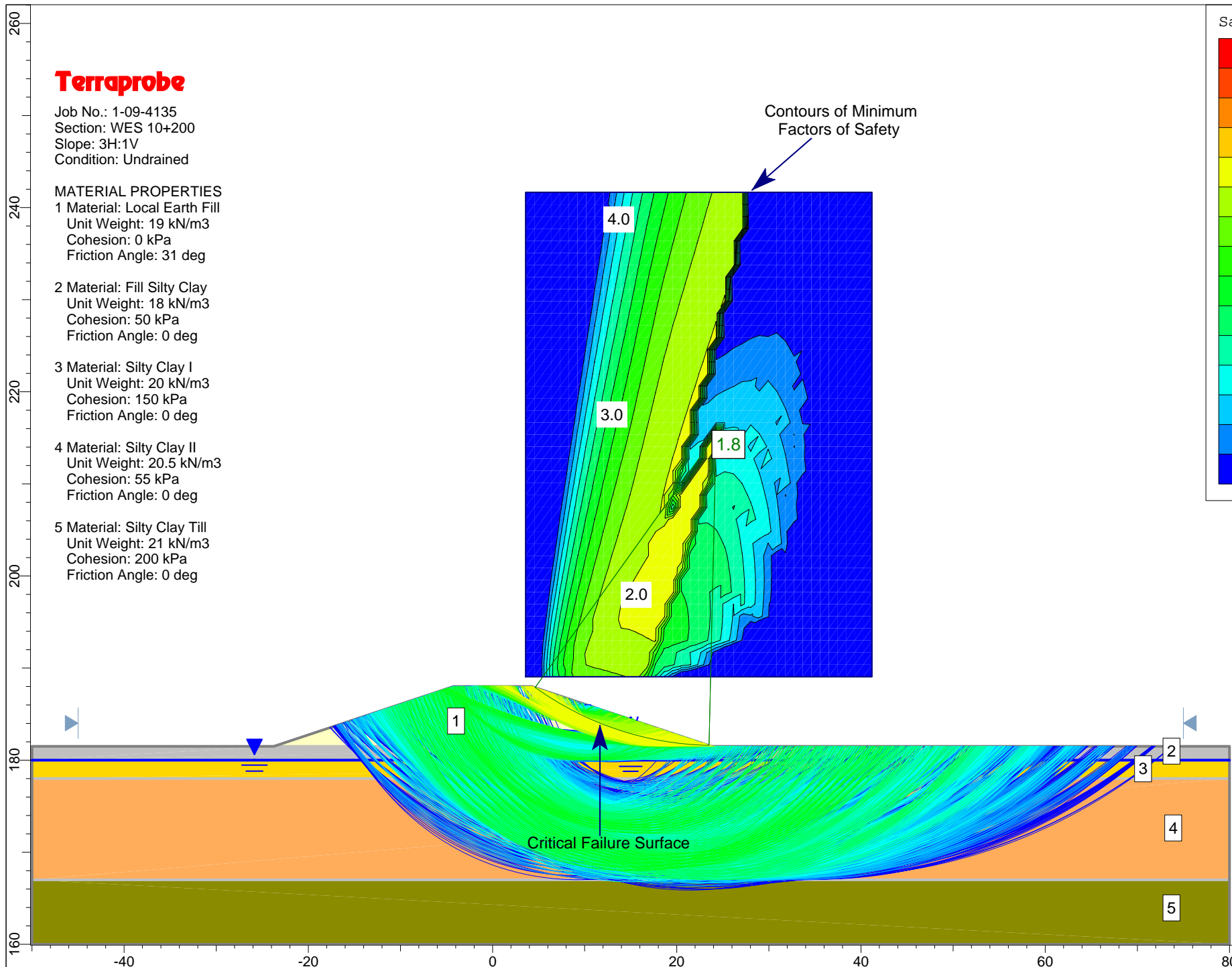
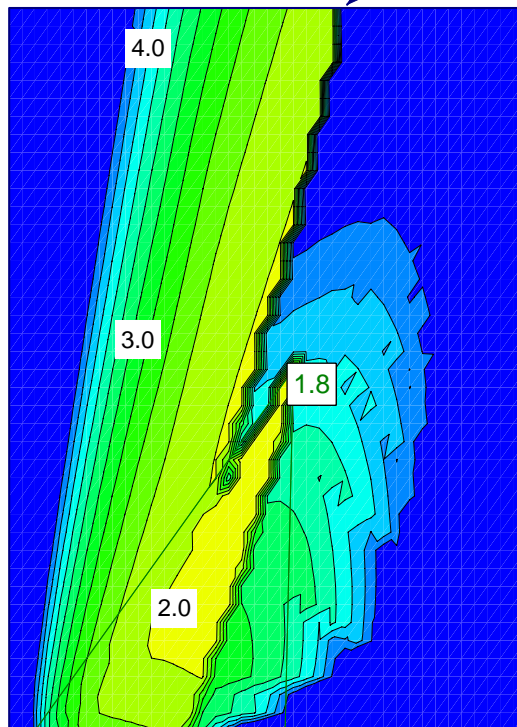
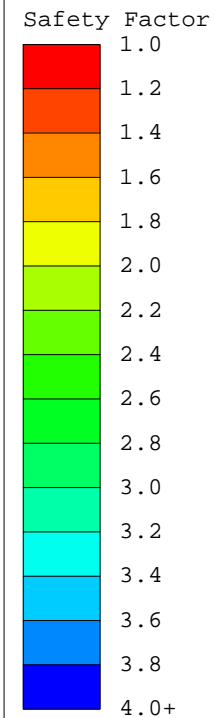
Terraprobe

Job No.: 1-09-4135
Section: WES 10+200
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety



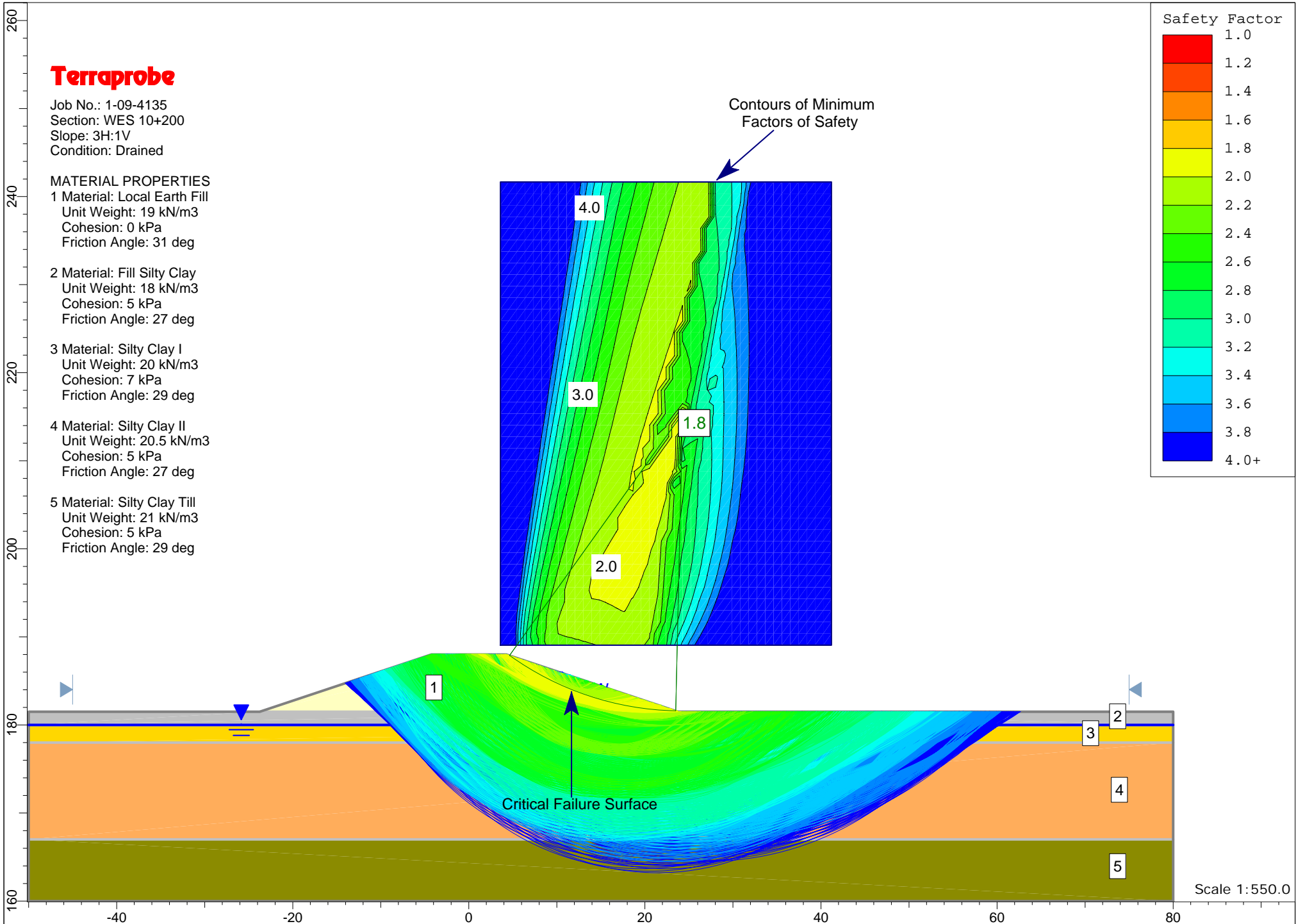
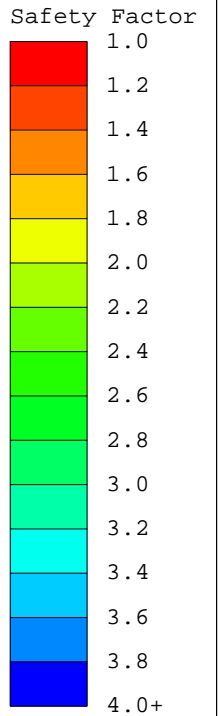
Terraprobe

Job No.: 1-09-4135
Section: WES 10+200
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety



Terraprobe

Job No.: 1-09-4135
Section: WES 10+200
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

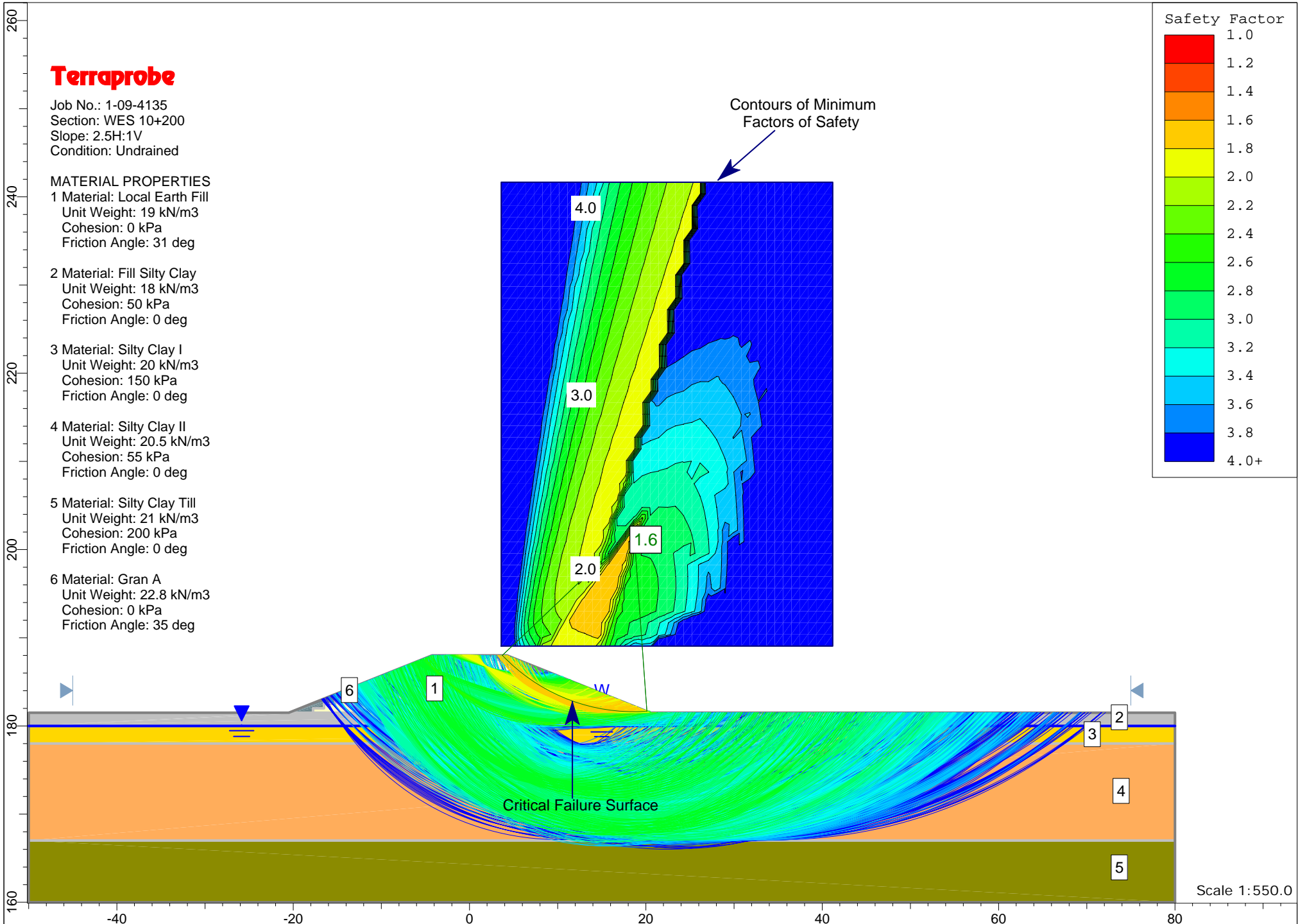
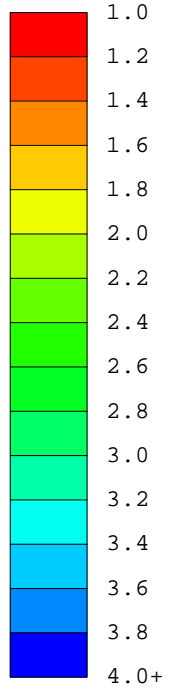
4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Terraprobe

Job No.: 1-09-4135
Section: WES 10+200
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

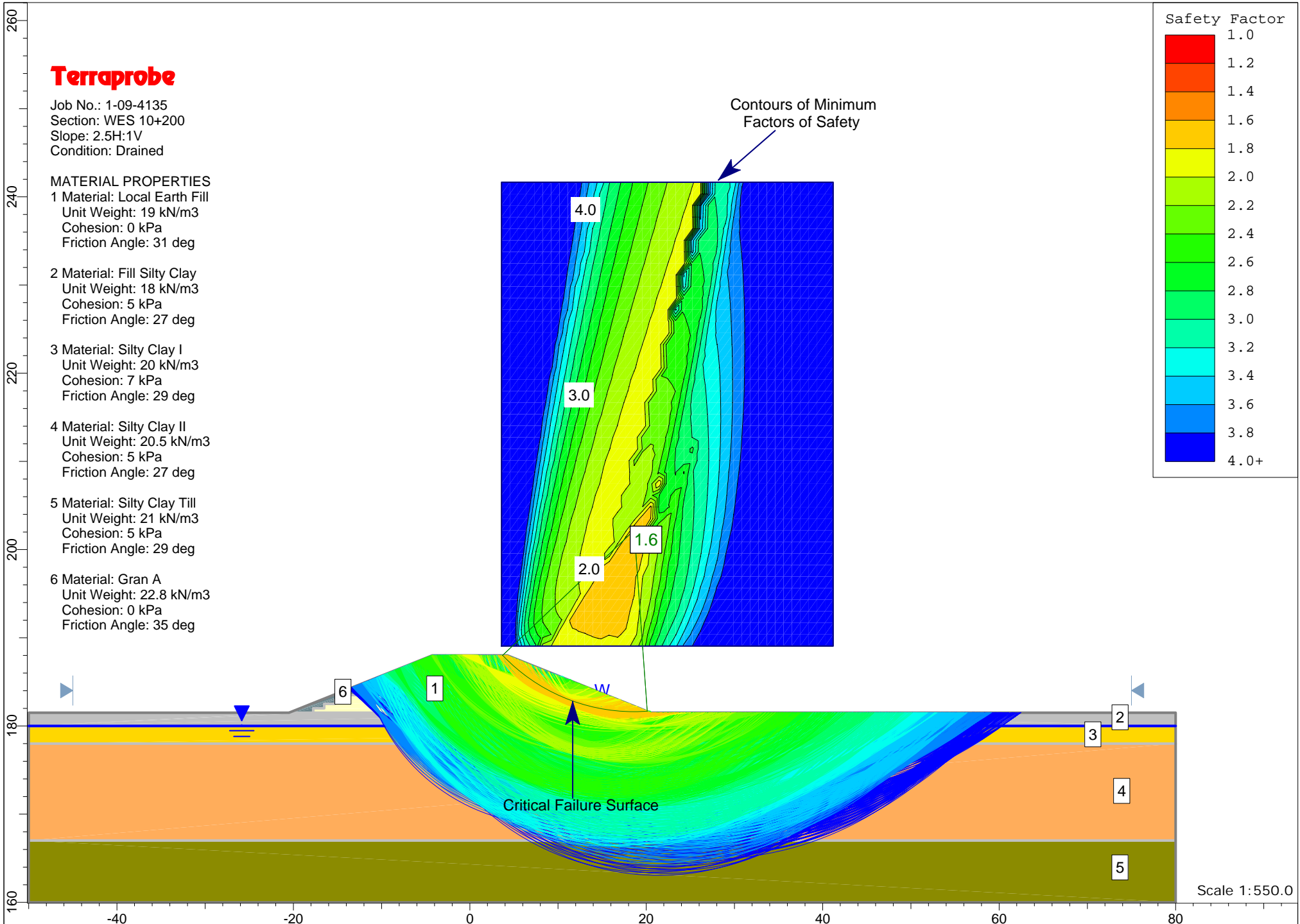
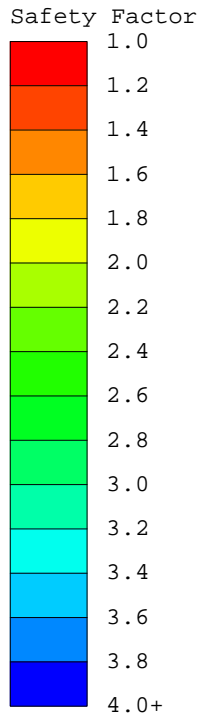
3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



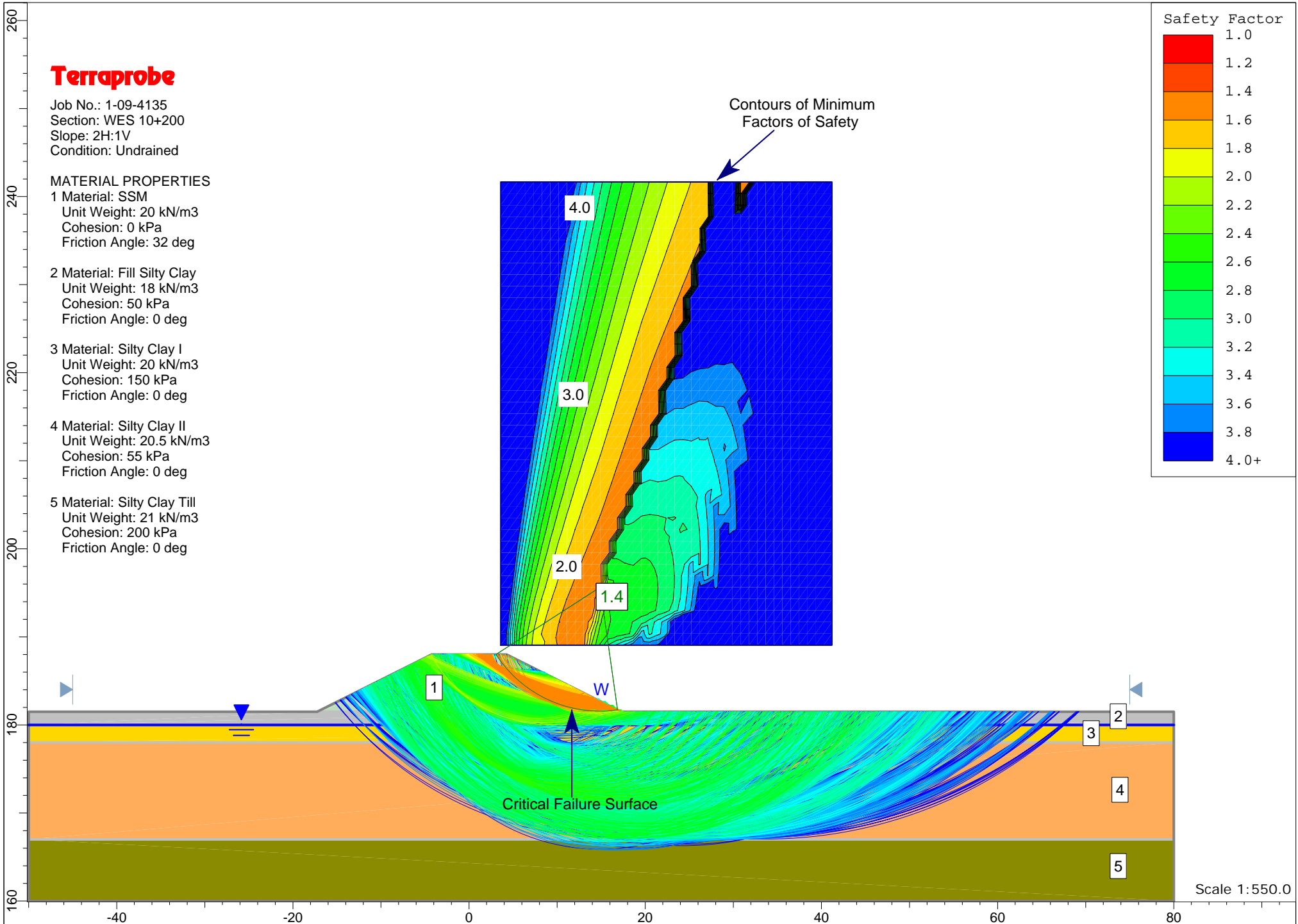
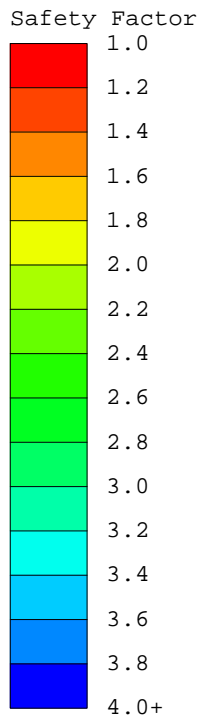
Terraprobe

Job No.: 1-09-4135
Section: WES 10+200
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety



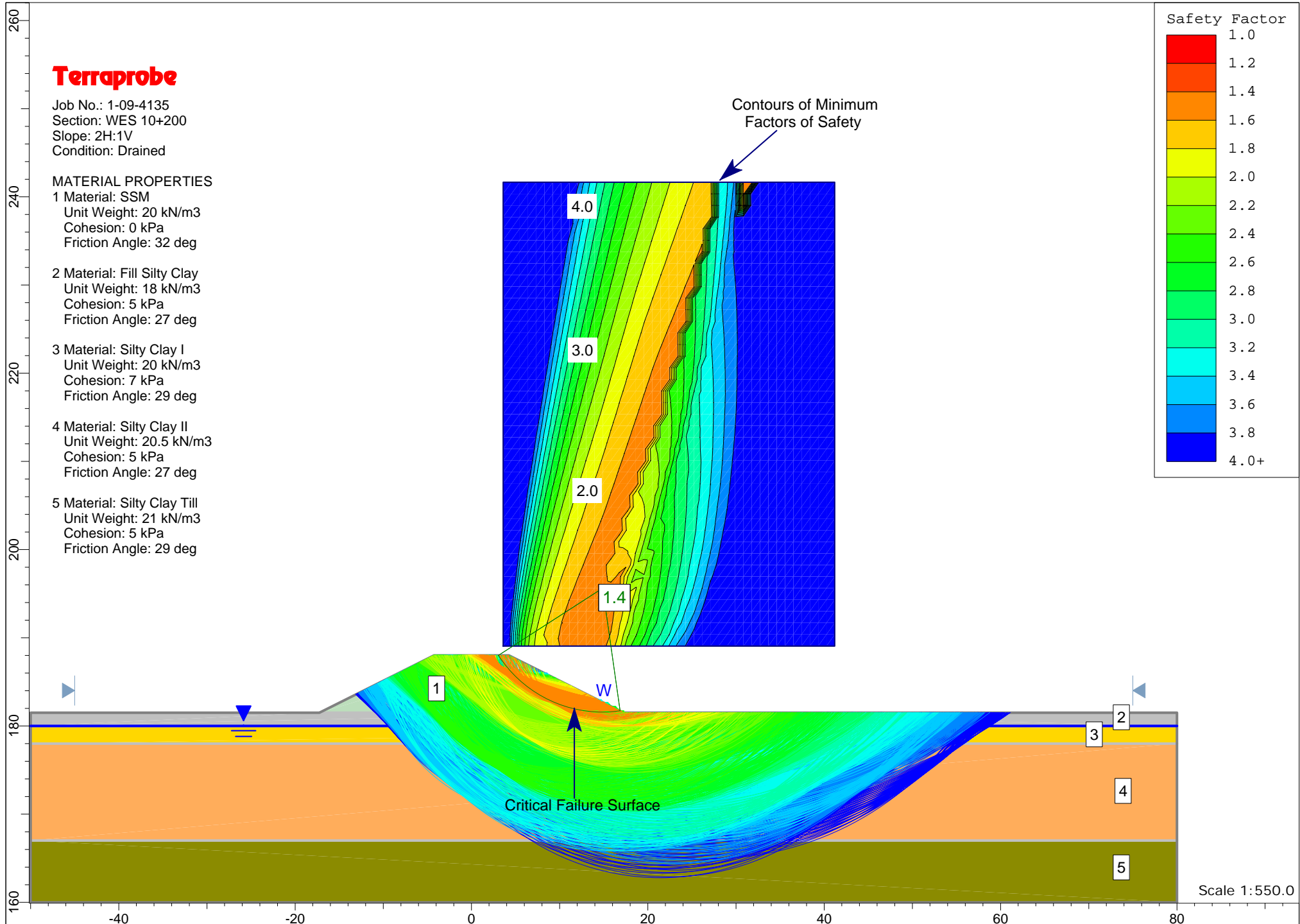
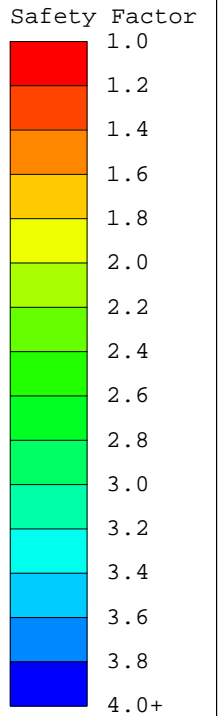
Terraprobe

Job No.: 1-09-4135
Section: WES 10+200
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety

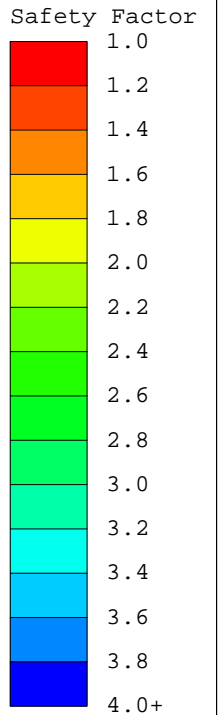


Terraprobe

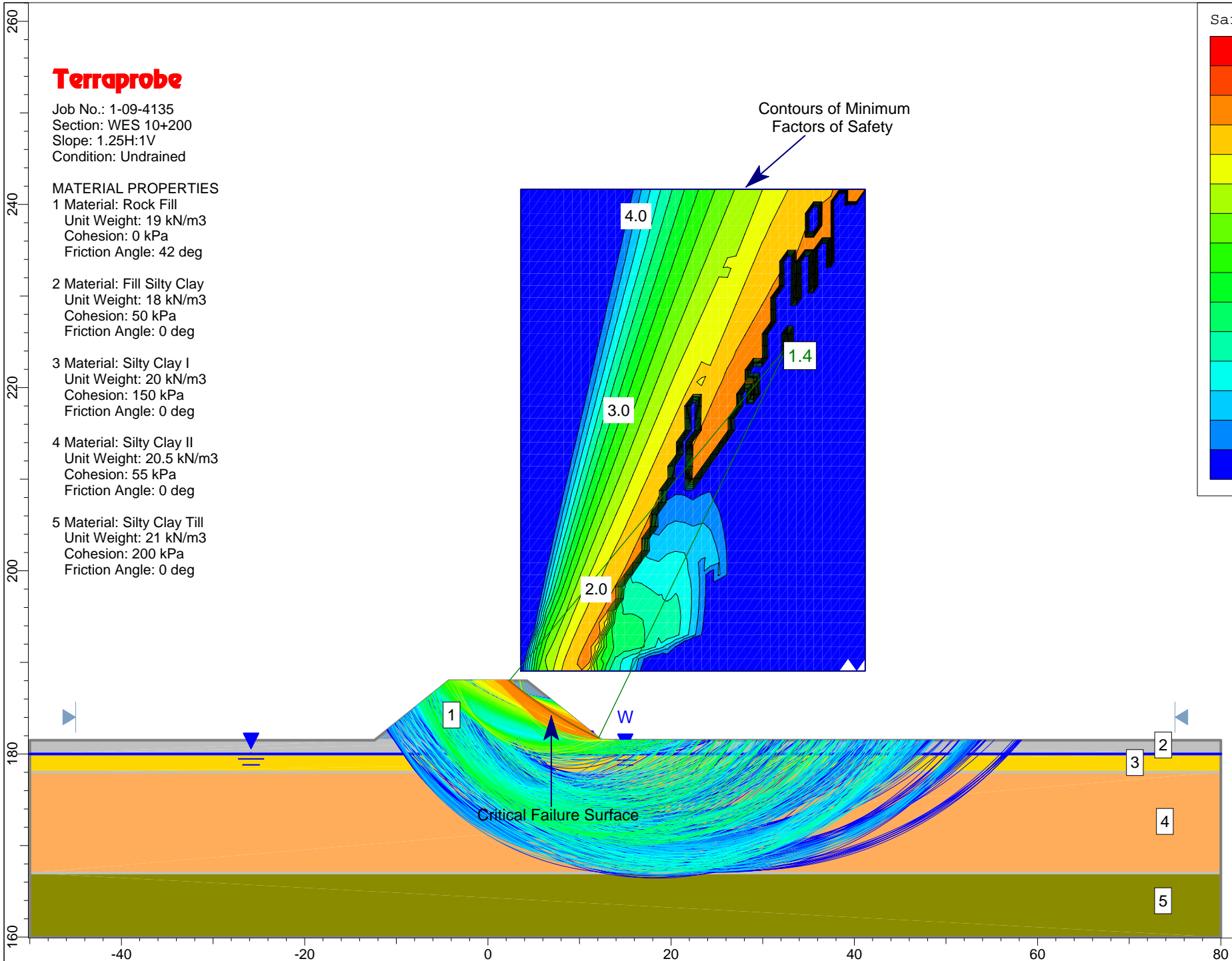
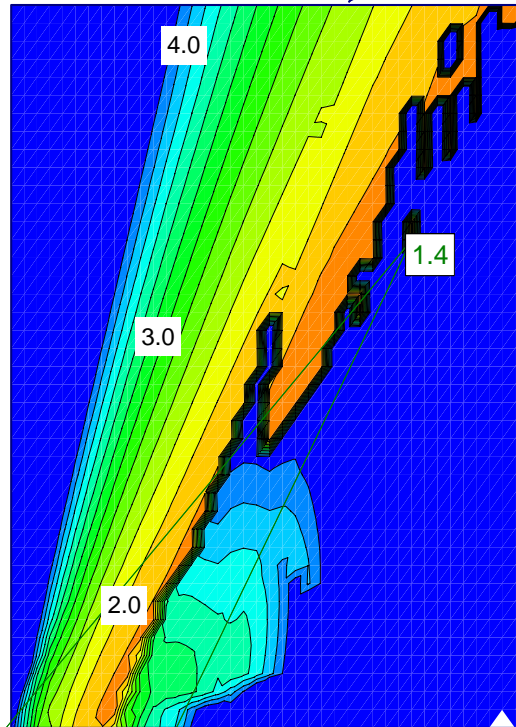
Job No.: 1-09-4135
Section: WES 10+200
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg



Contours of Minimum
Factors of Safety



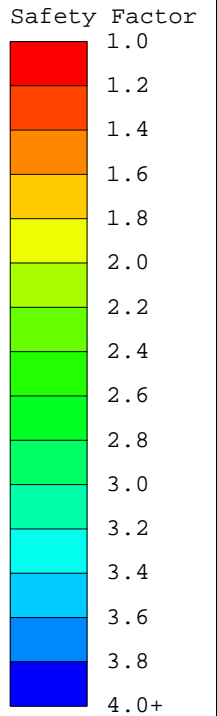
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Terraprobe

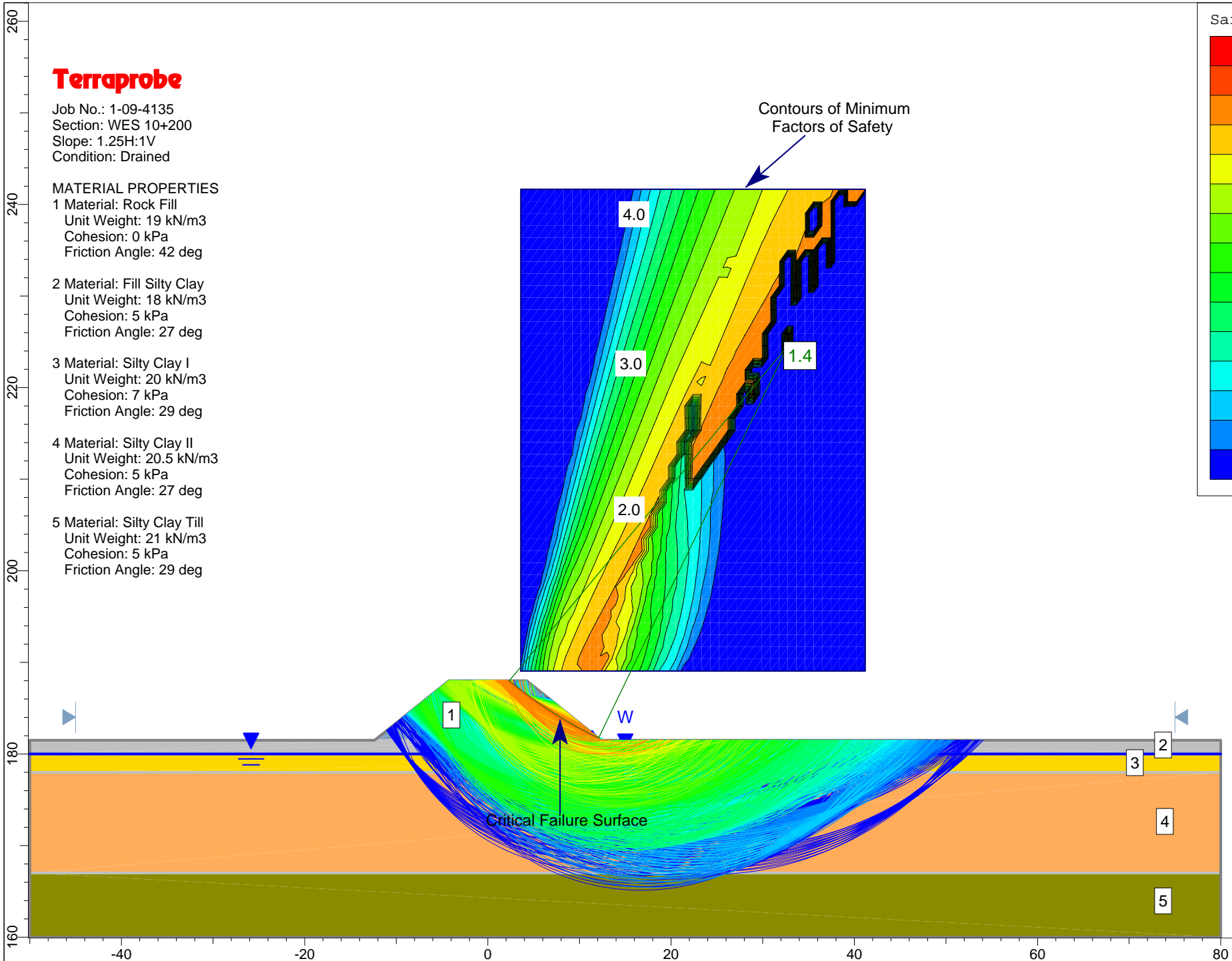
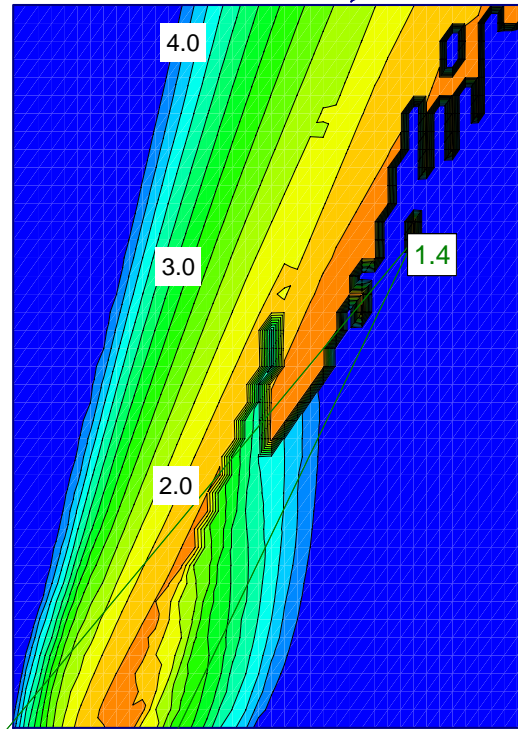
Job No.: 1-09-4135
Section: WES 10+200
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



Terraprobe

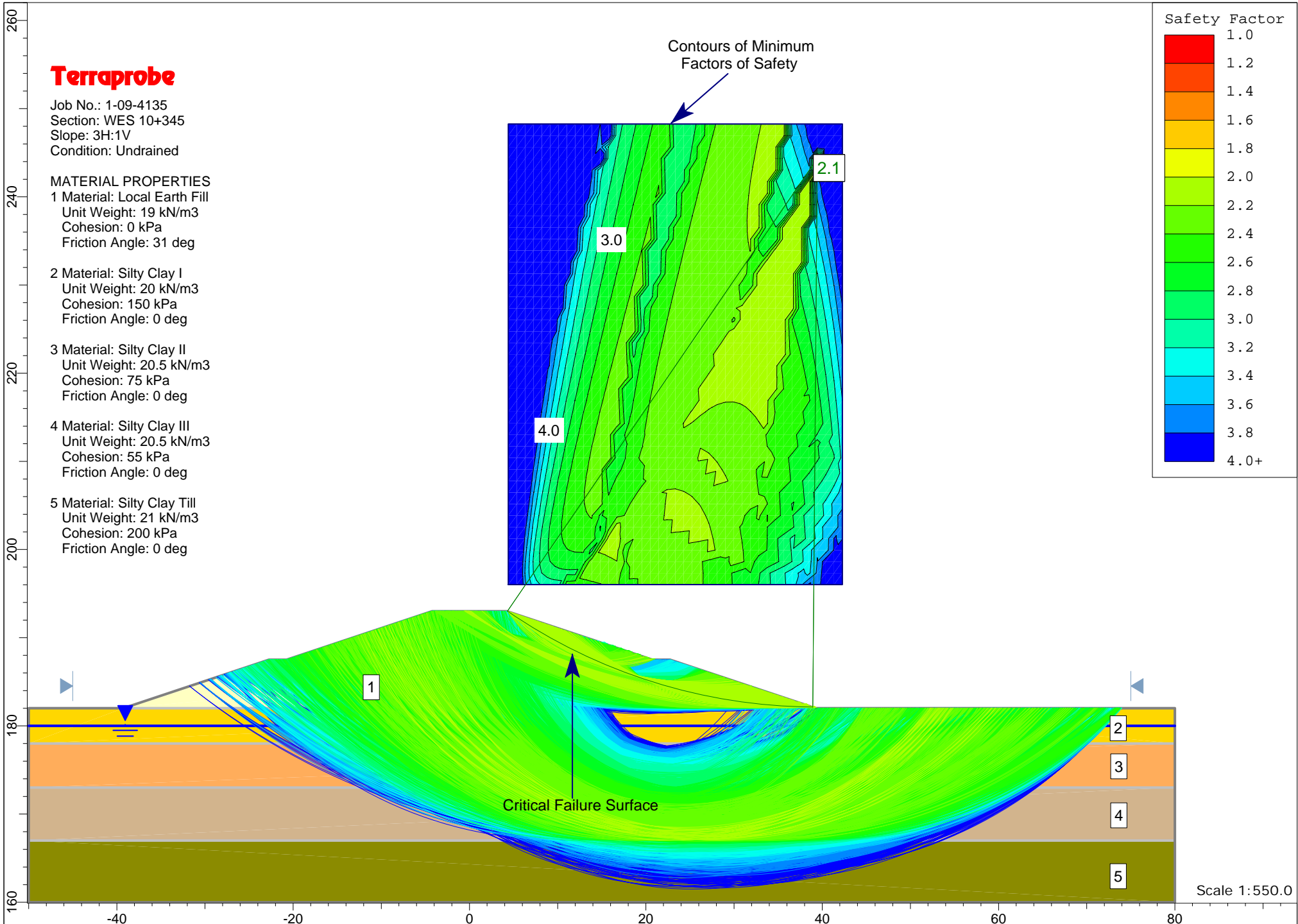
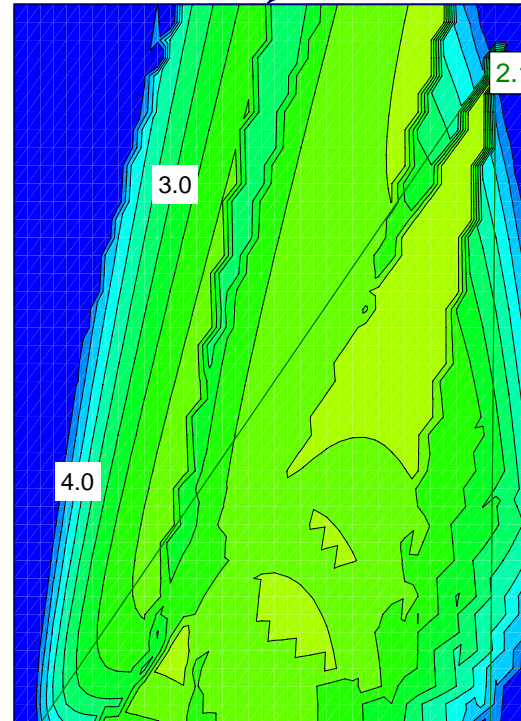
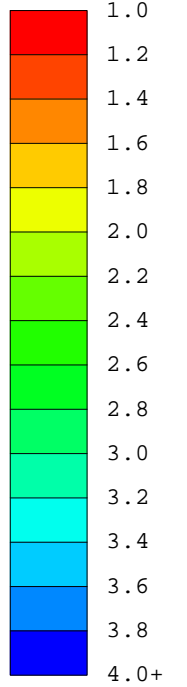
Job No.: 1-09-4135
Section: WES 10+345
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 75 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety

Safety Factor



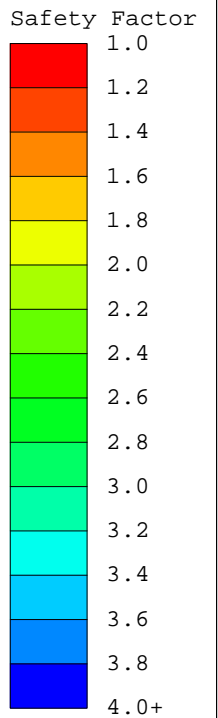
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Terraprobe

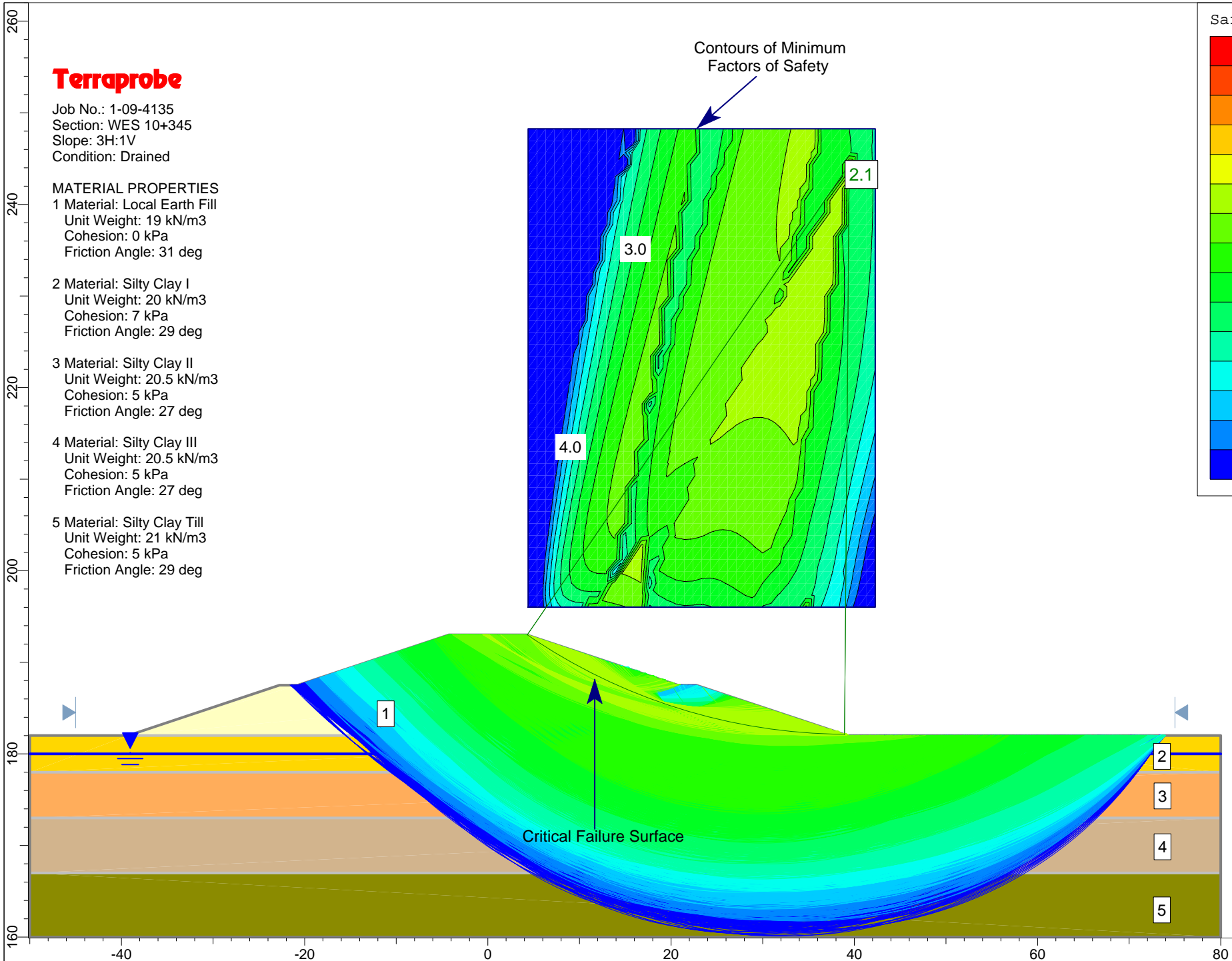
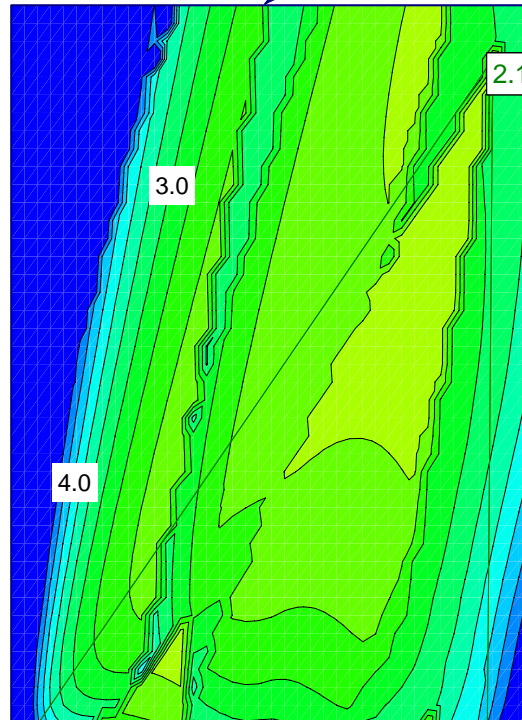
Job No.: 1-09-4135
Section: WES 10+345
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



Scale 1:550.0

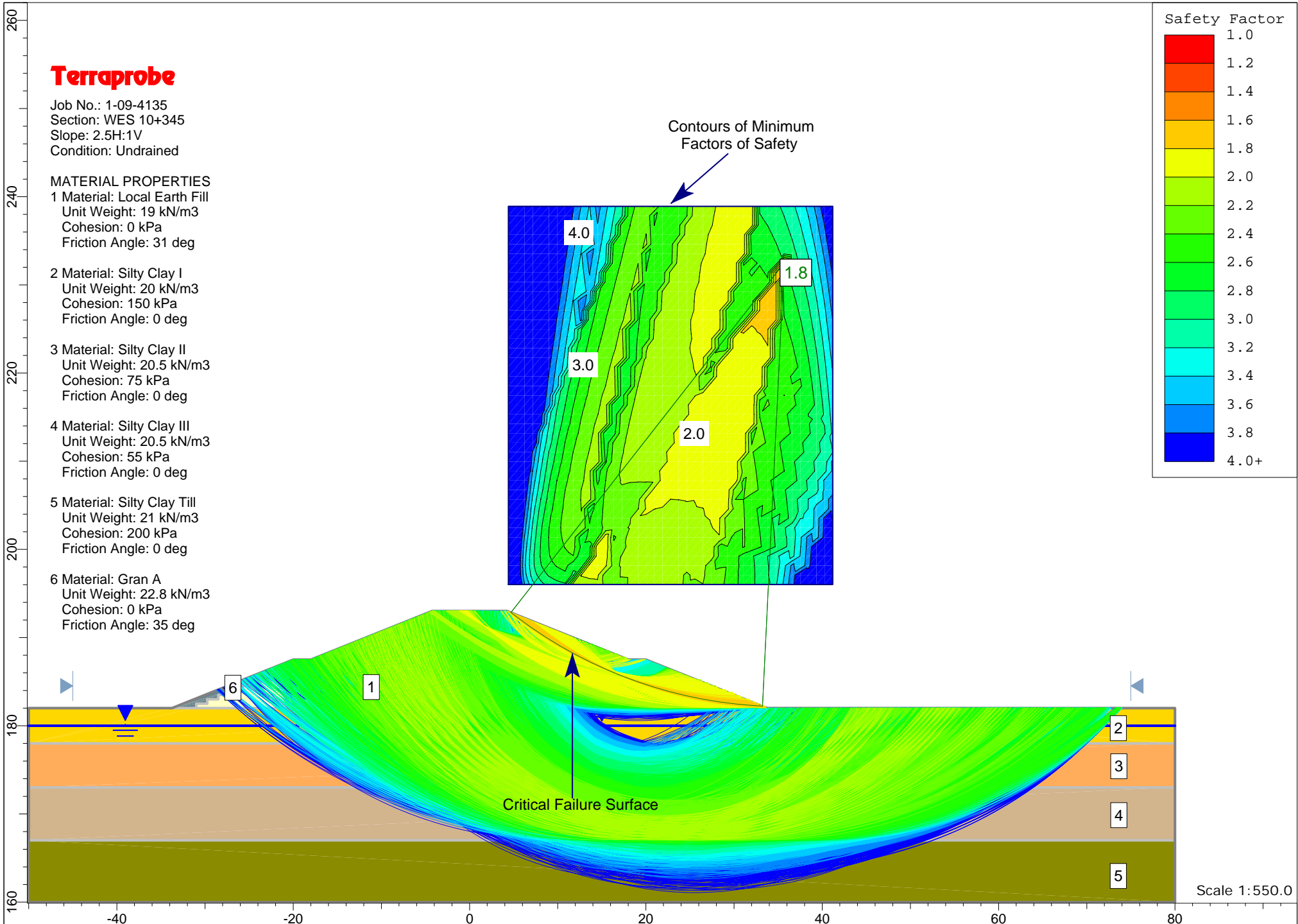
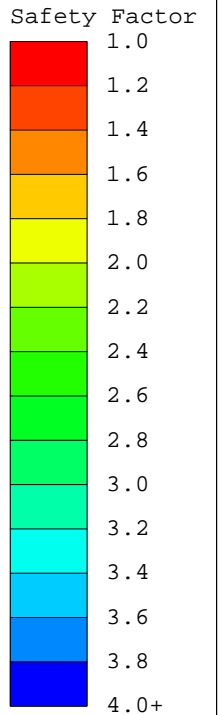
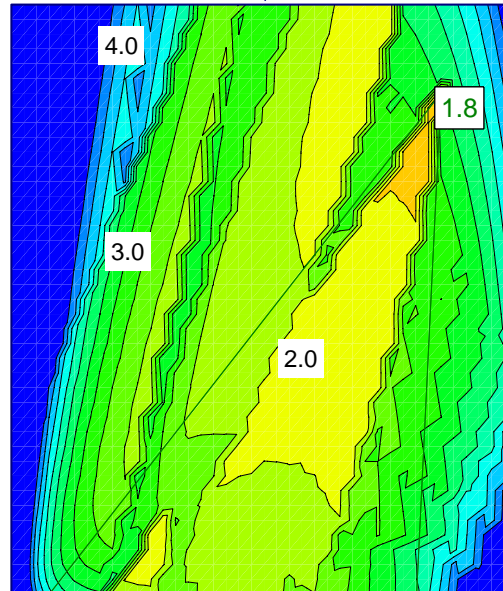
Terraprobe

Job No.: 1-09-4135
Section: WES 10+345
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 75 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



Terraprobe

Job No.: 1-09-4135
Section: WES 10+345
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

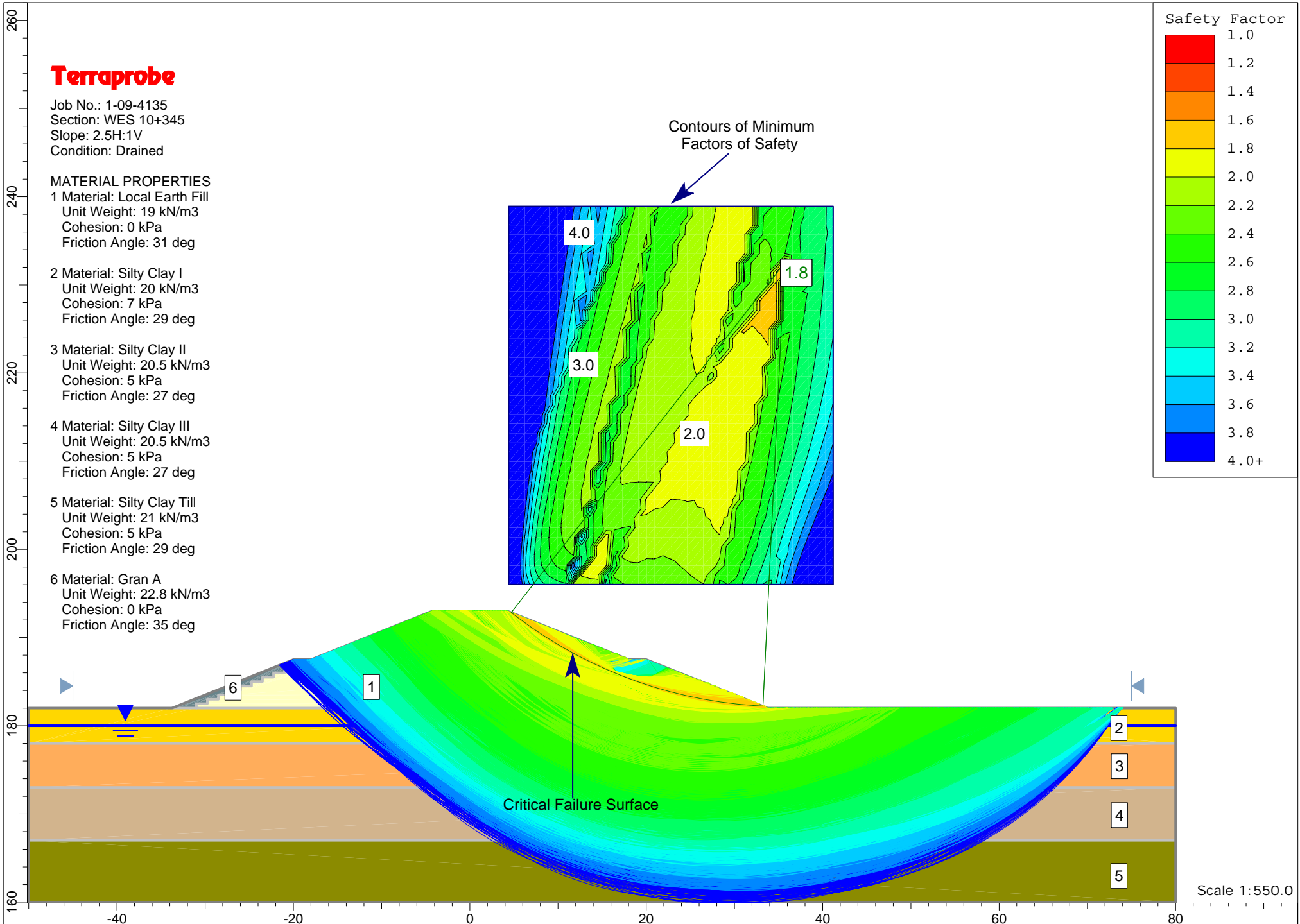
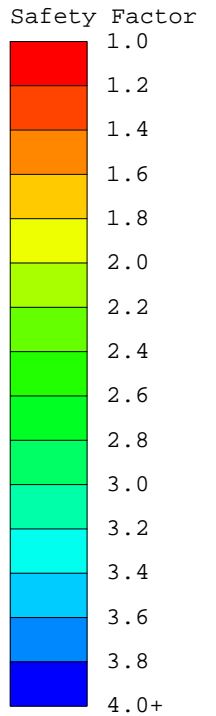
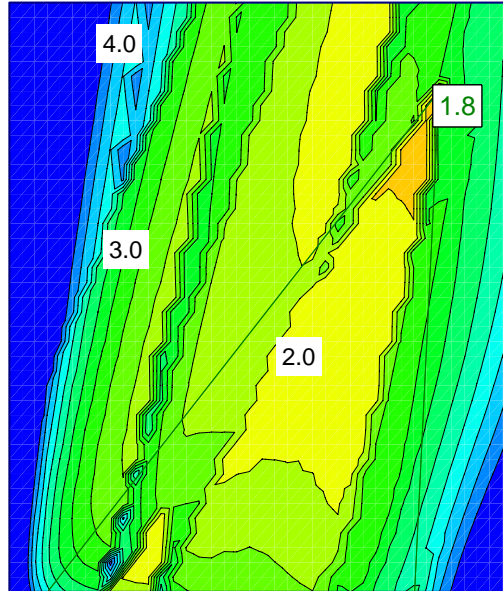
3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



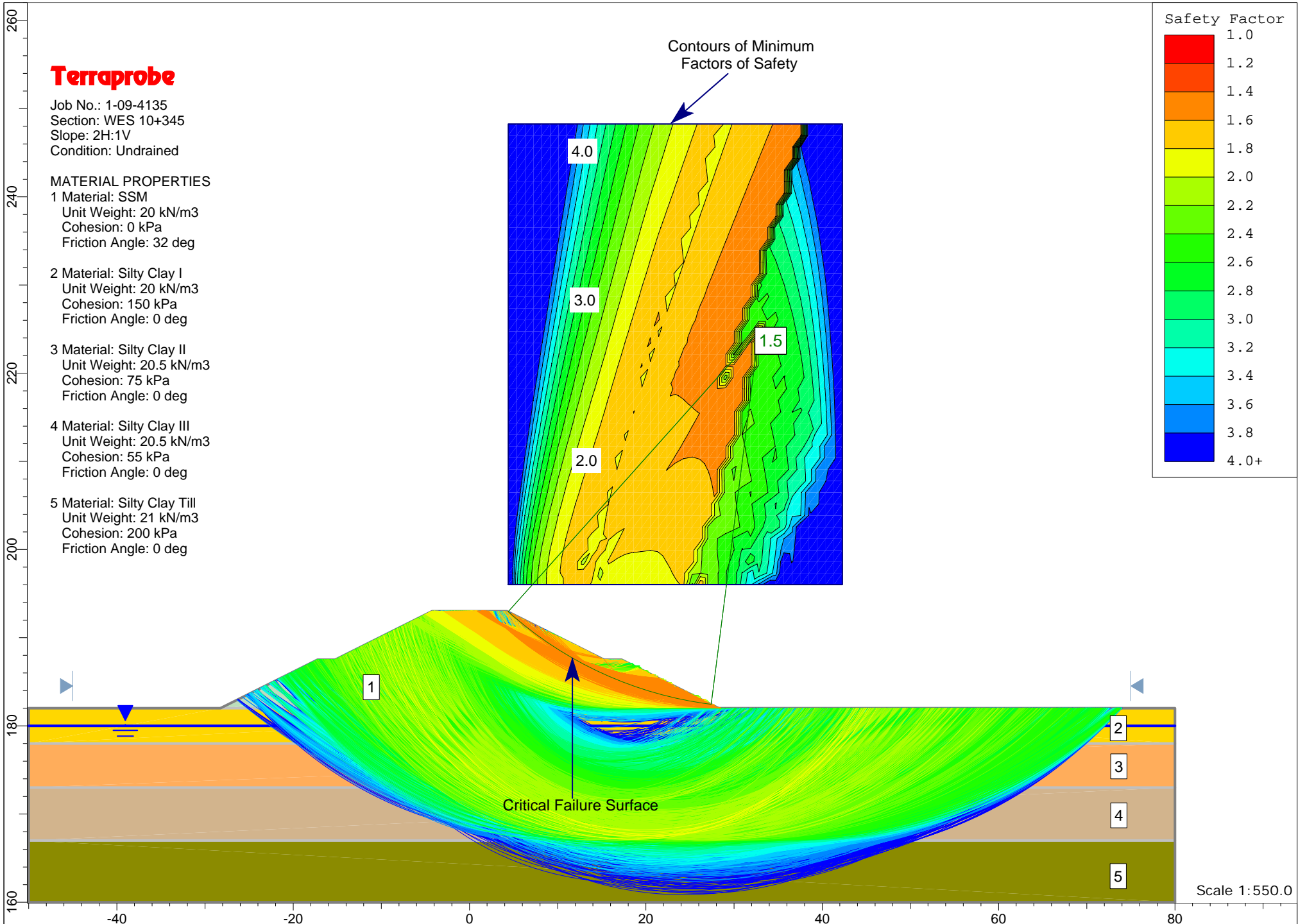
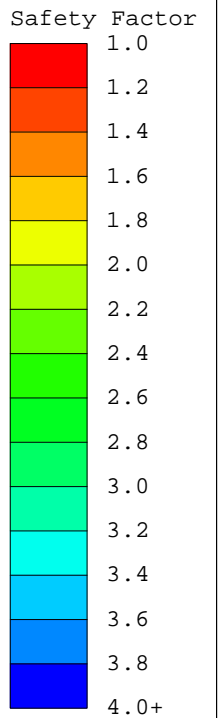
Terraprobe

Job No.: 1-09-4135
Section: WES 10+345
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 75 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety

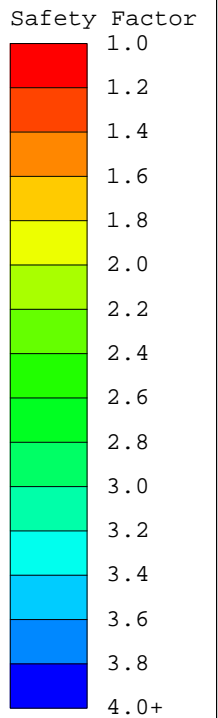


Terraprobe

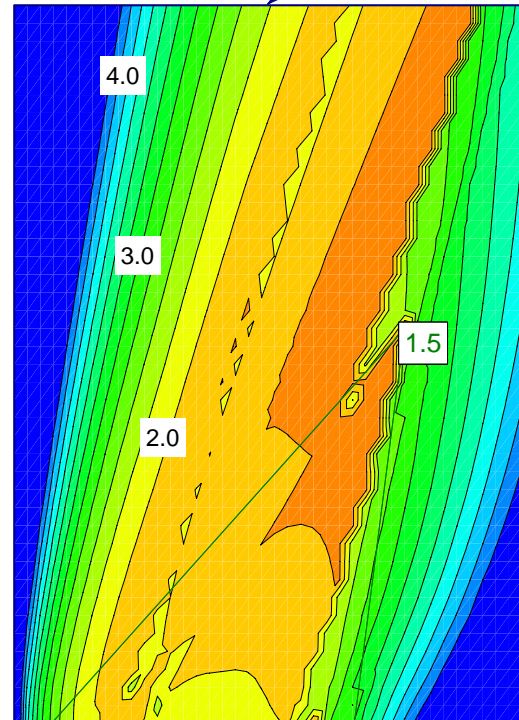
Job No.: 1-09-4135
Section: WES 10+345
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

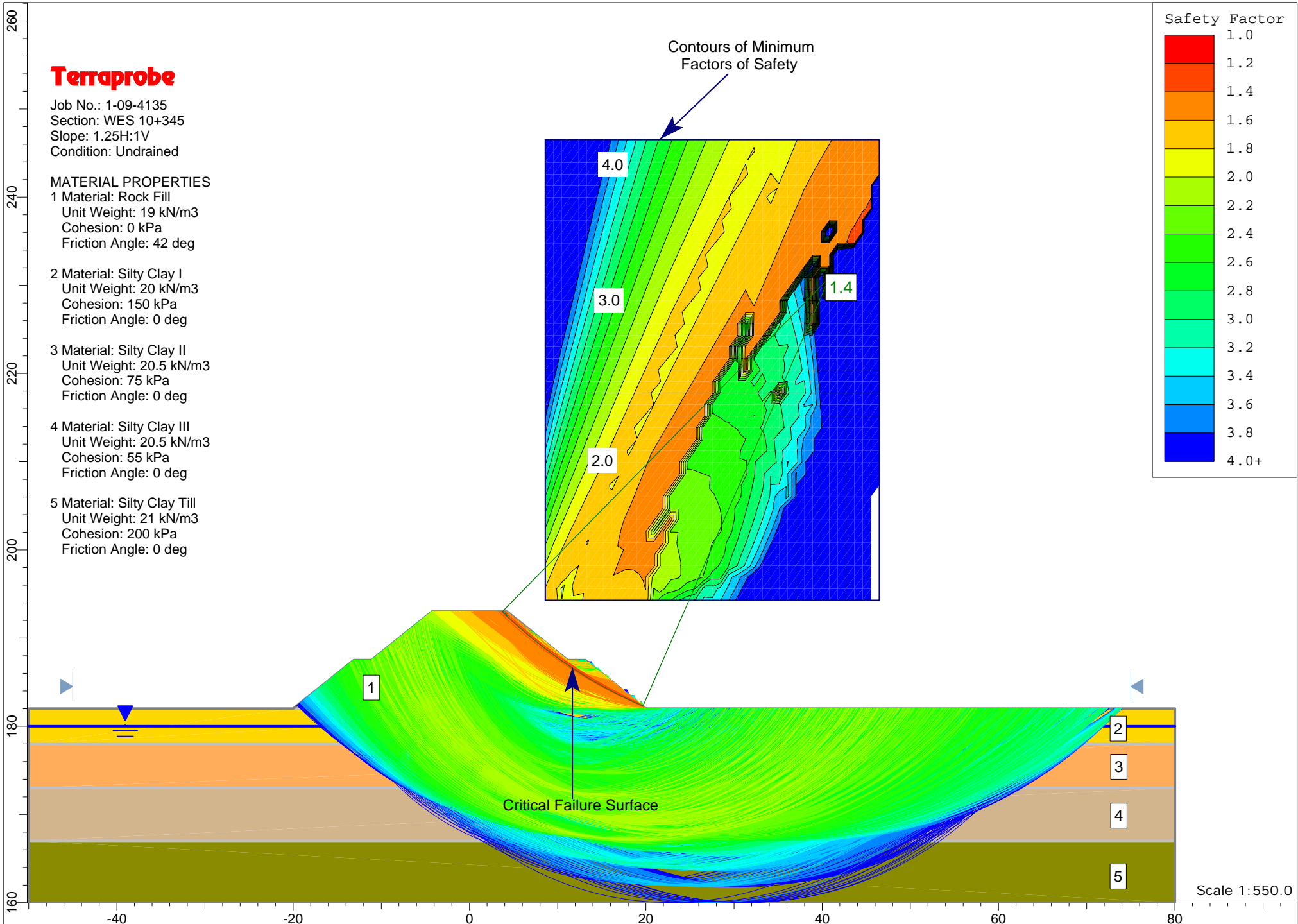
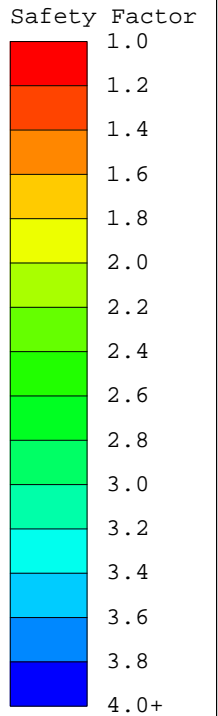
Terraprobe

Job No.: 1-09-4135
Section: WES 10+345
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 75 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety

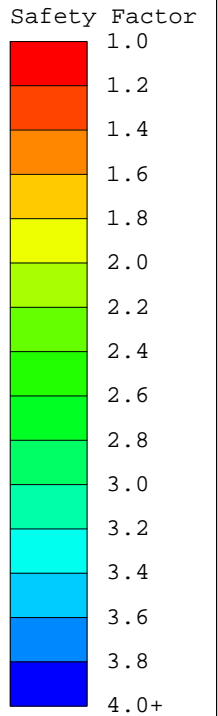


Terraprobe

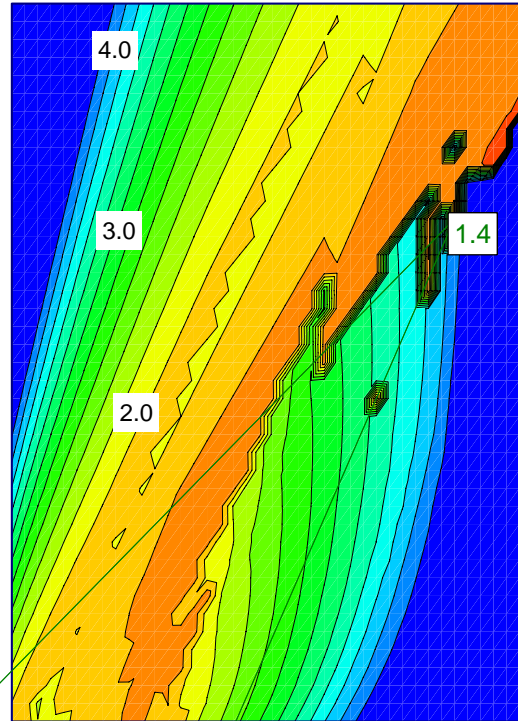
Job No.: 1-09-4135
Section: WES 10+345
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

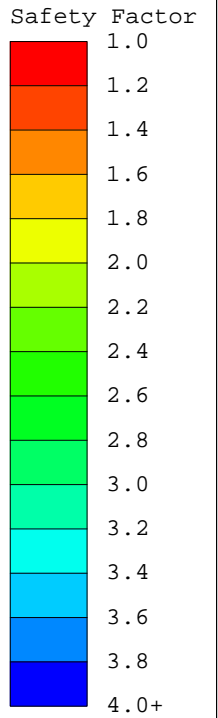
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Terraprobe

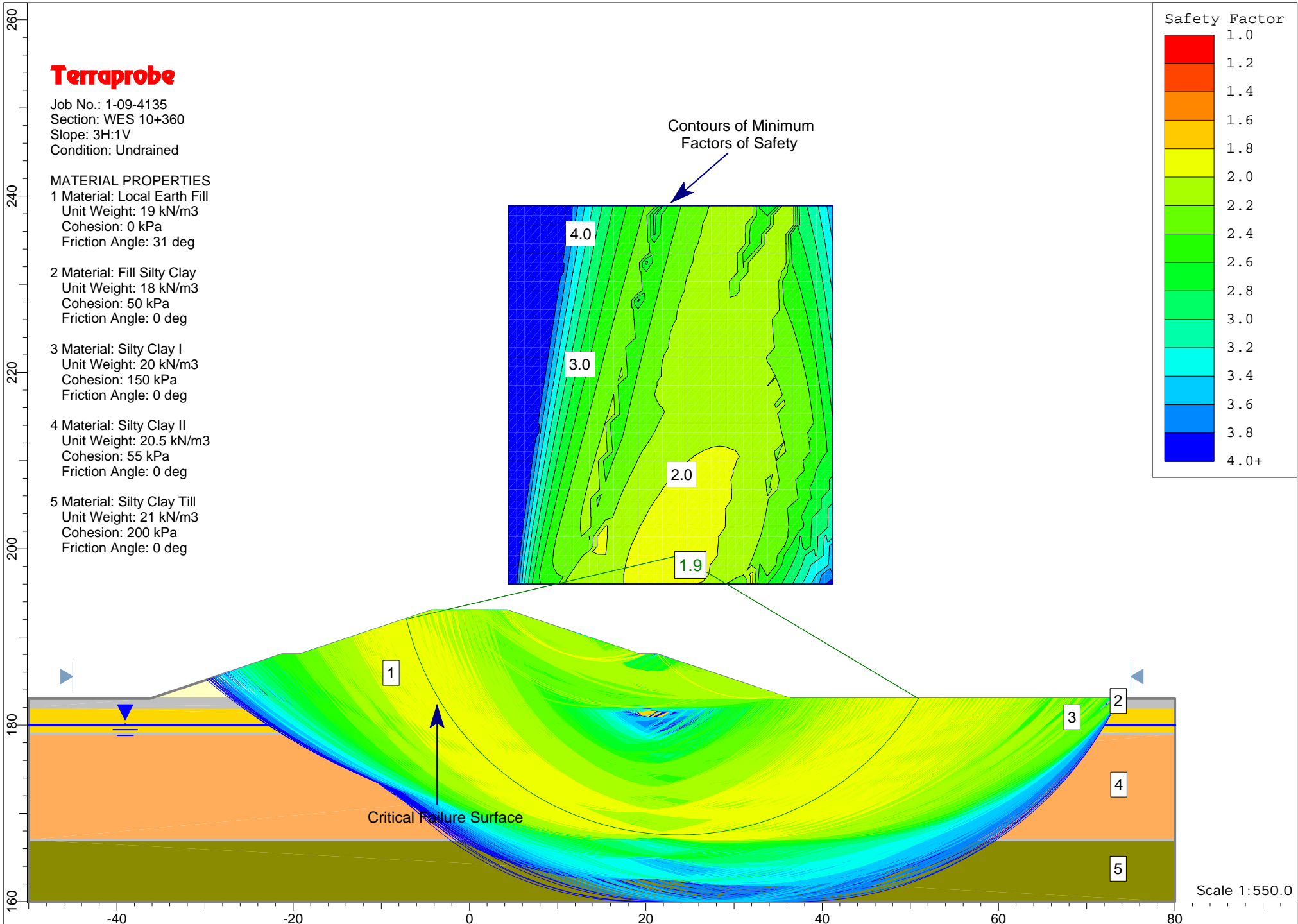
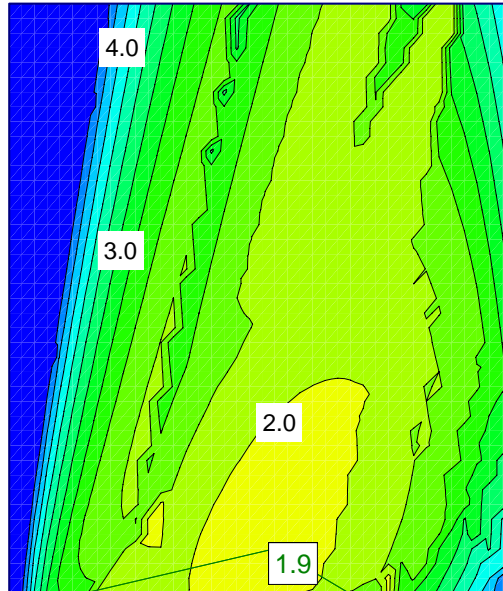
Job No.: 1-09-4135
Section: WES 10+360
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg



Contours of Minimum
Factors of Safety



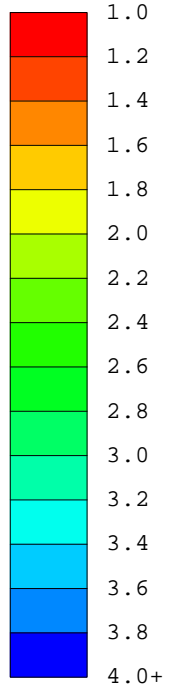
Terraprobe

Job No.: 1-09-4135
Section: WES 10+360
Slope: 3H:1V
Condition: Drained

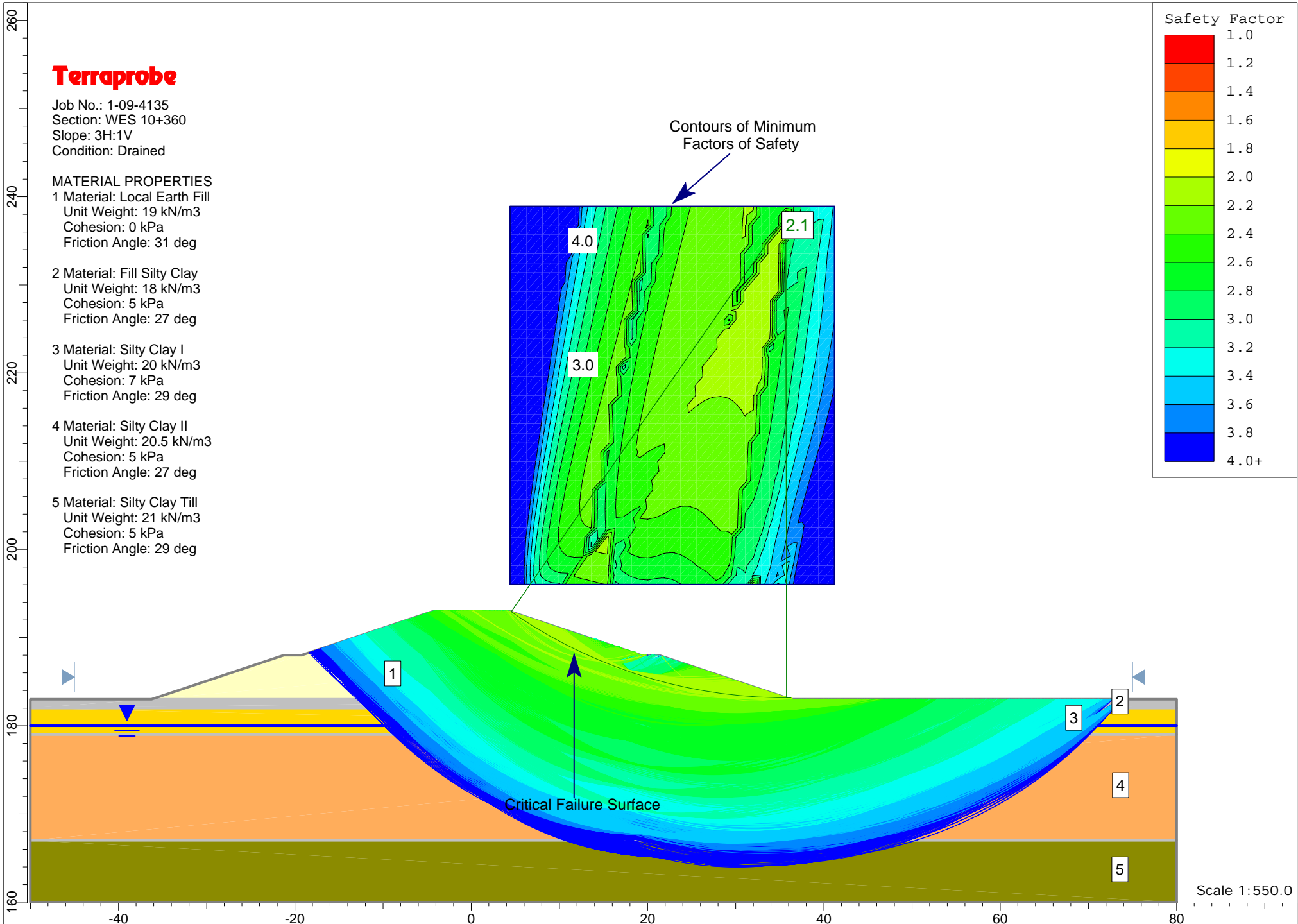
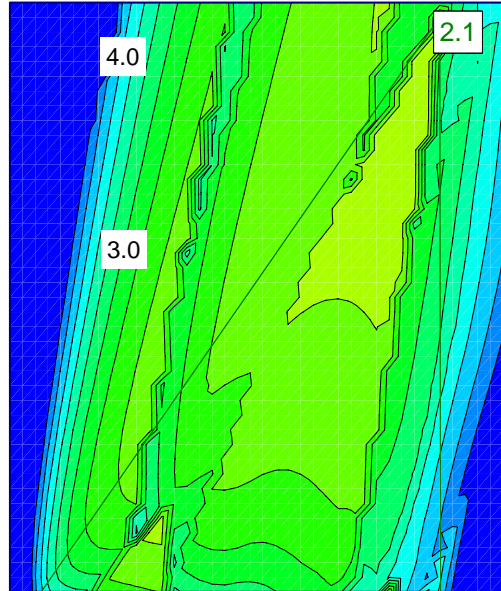
MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Safety Factor



Contours of Minimum
Factors of Safety



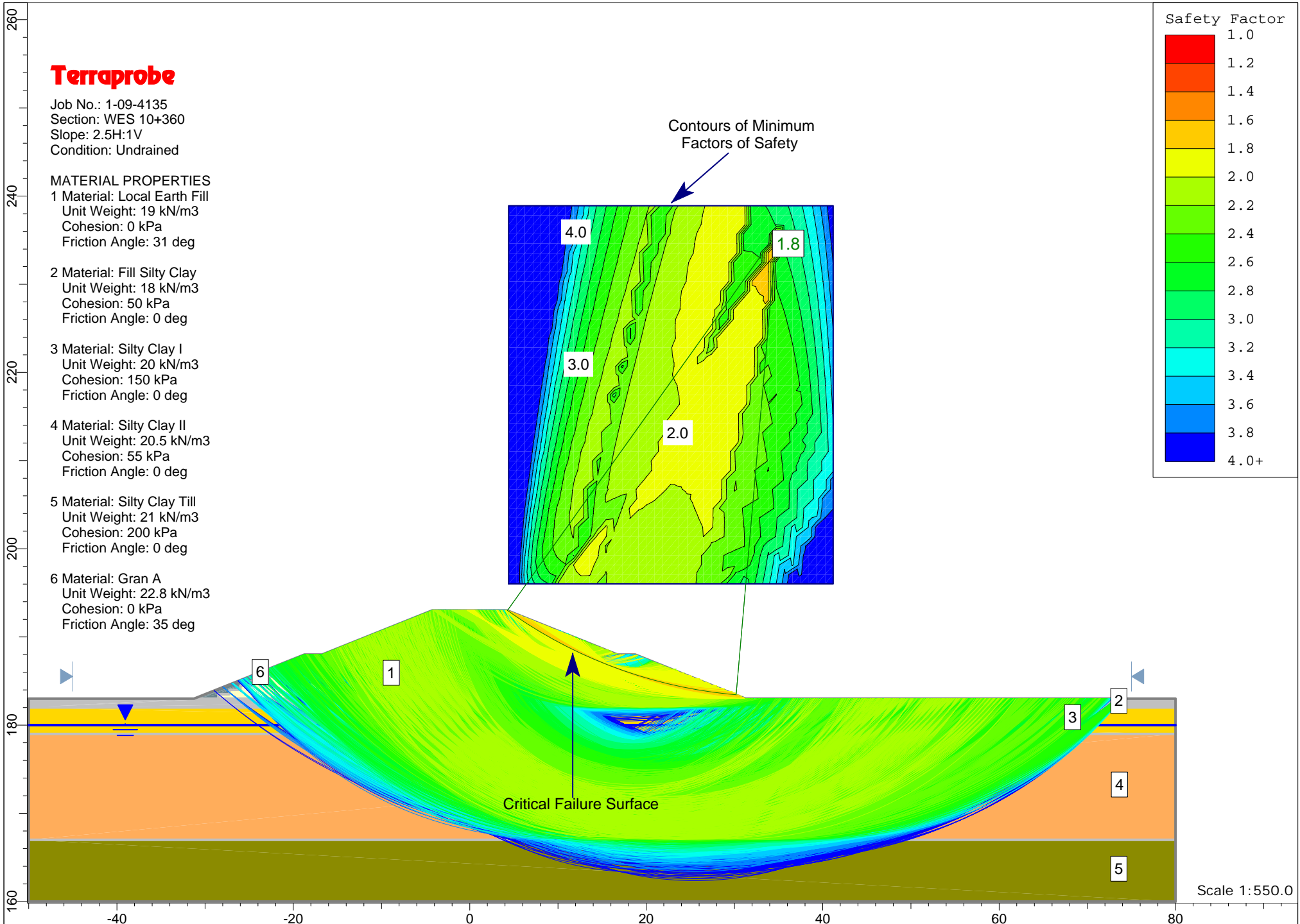
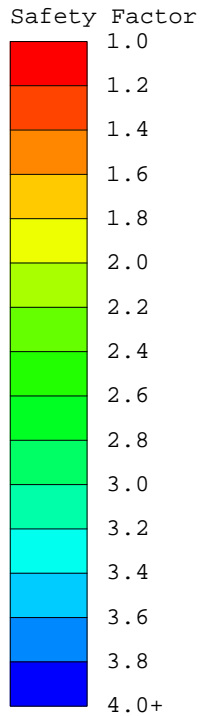
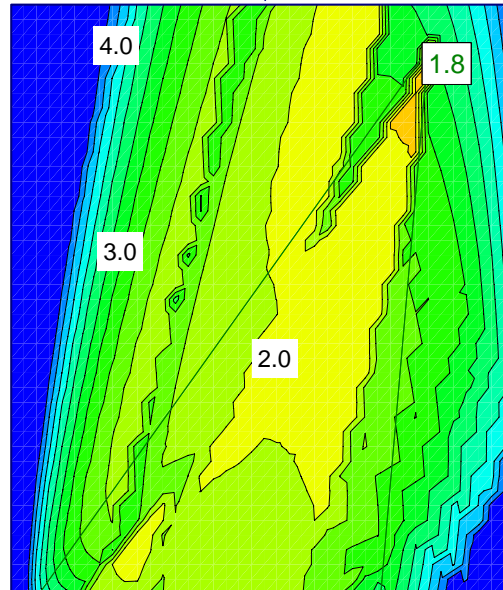
Terraprobe

Job No.: 1-09-4135
Section: WES 10+360
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

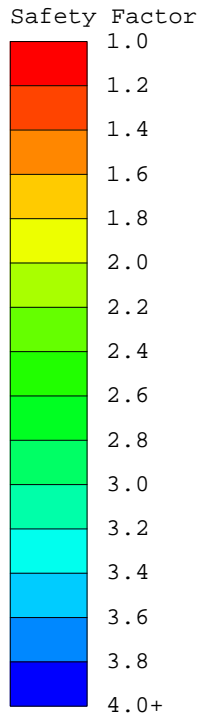


Terraprobe

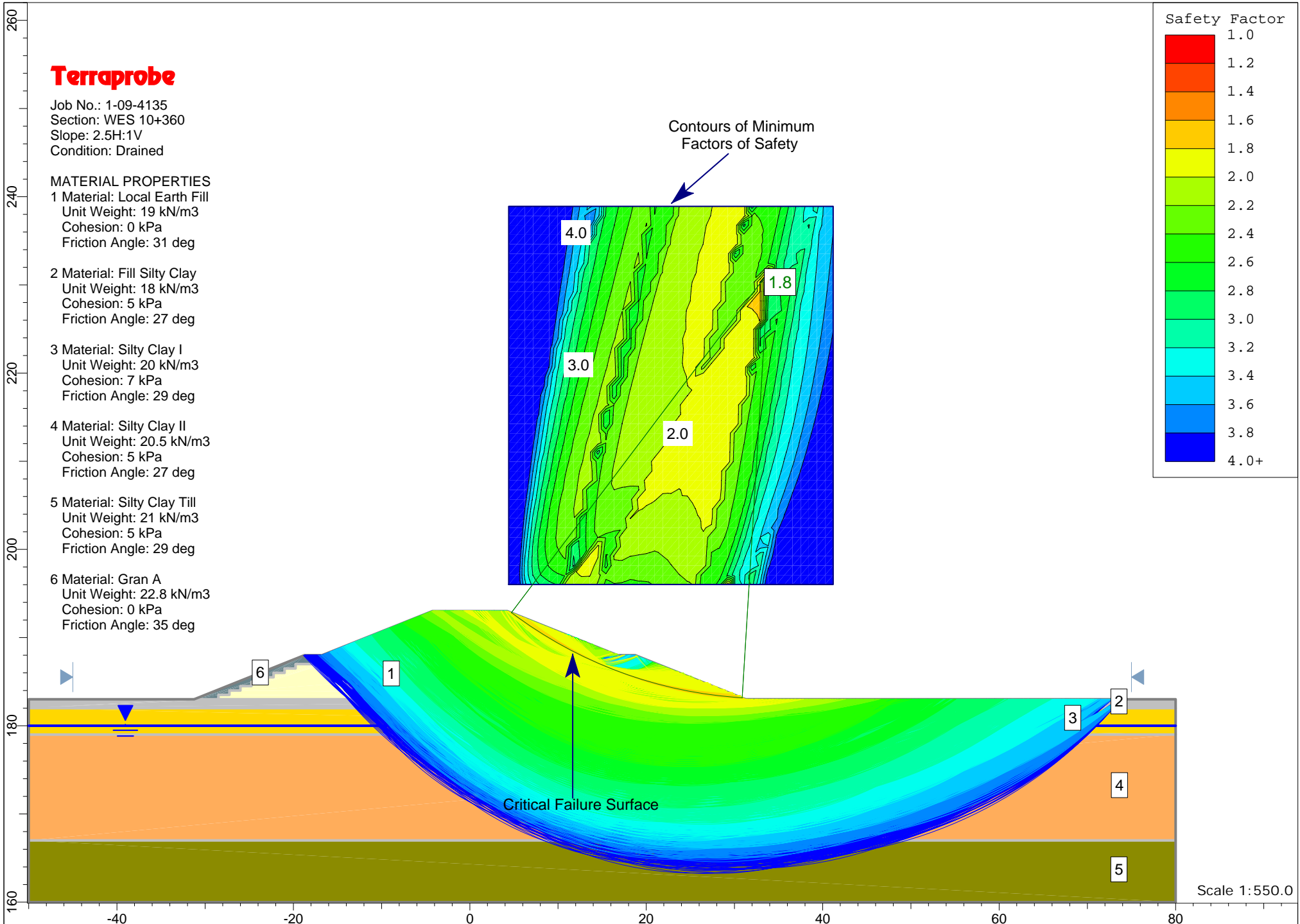
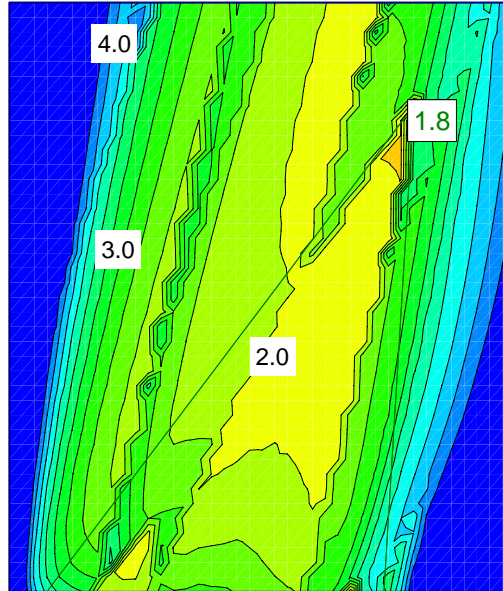
Job No.: 1-09-4135
Section: WES 10+360
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg



Contours of Minimum
Factors of Safety



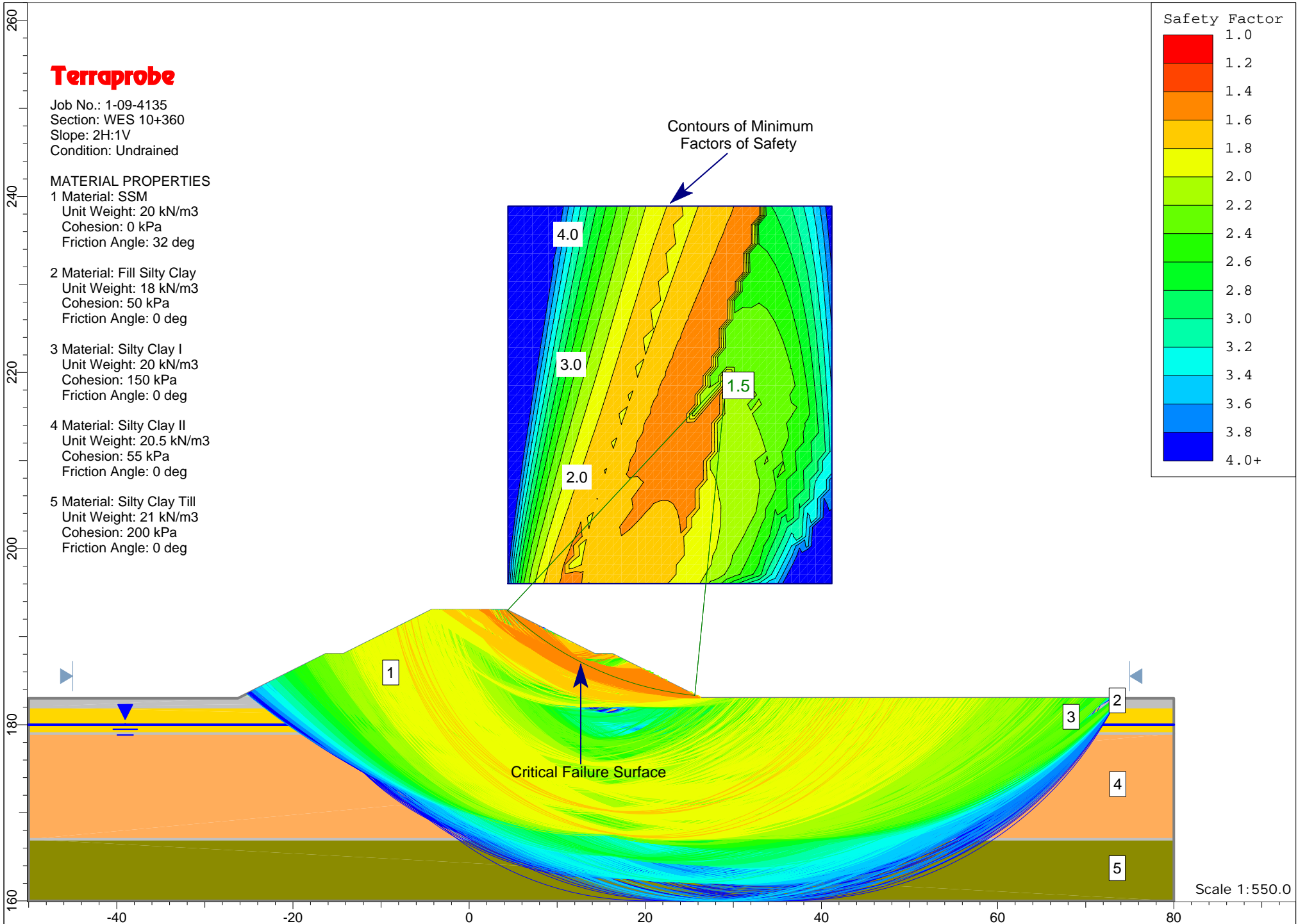
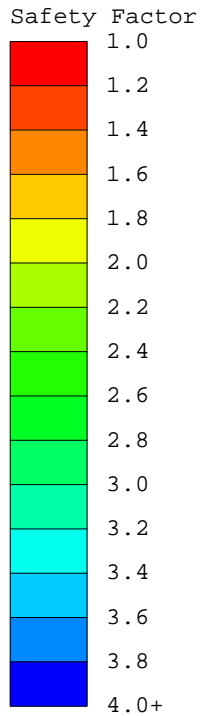
Terraprobe

Job No.: 1-09-4135
Section: WES 10+360
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety



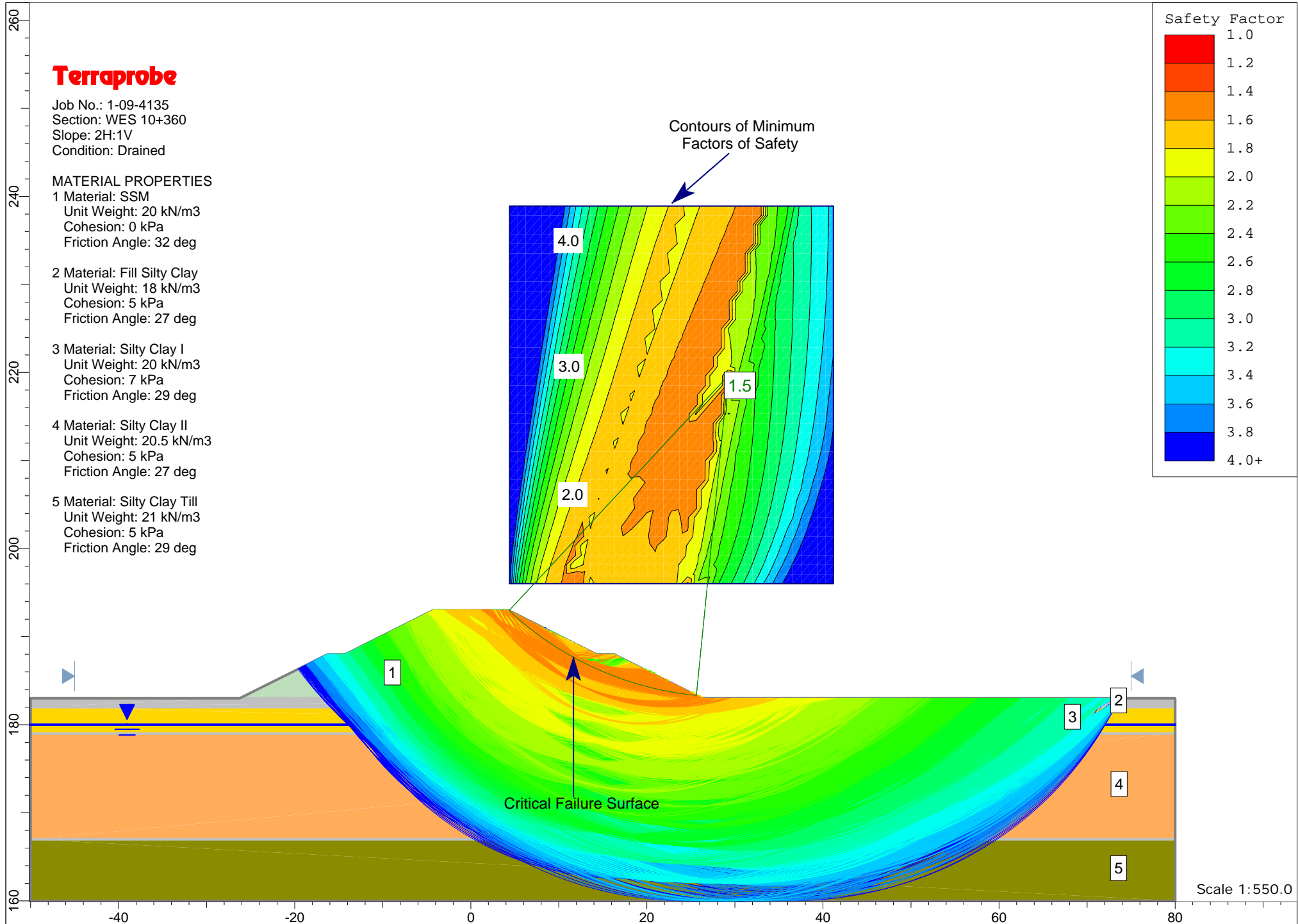
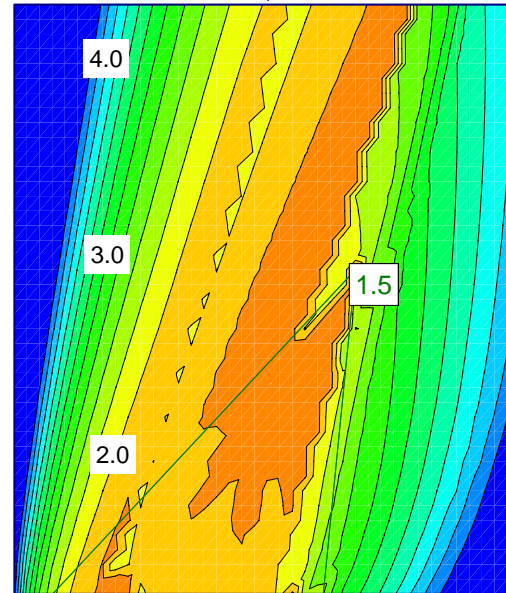
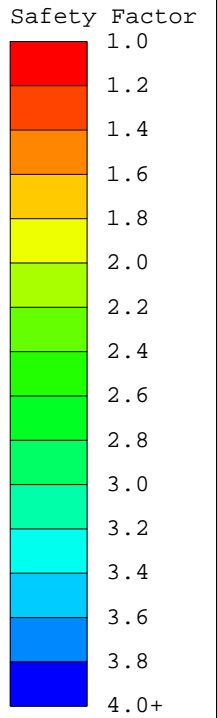
Terraprobe

Job No.: 1-09-4135
Section: WES 10+360
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety

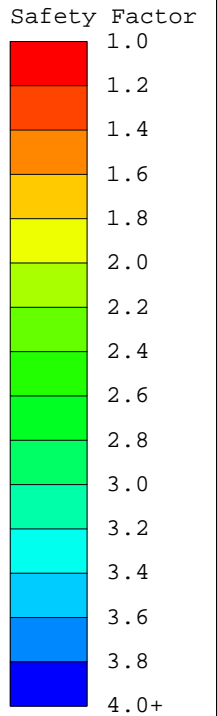


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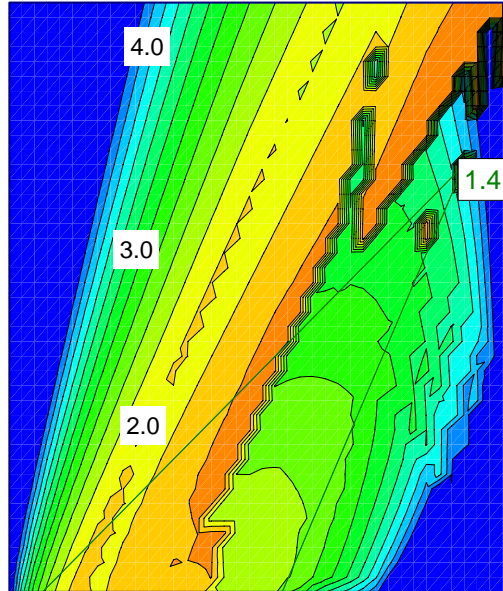
Job No.: 1-09-4135
Section: WES 10+360
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 55 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

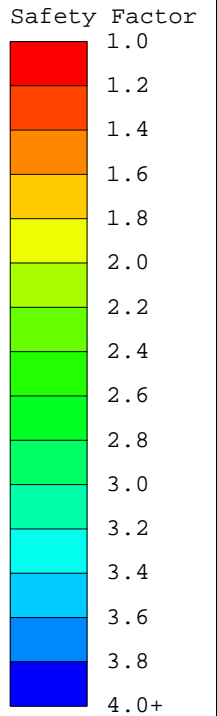
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Terraprobe

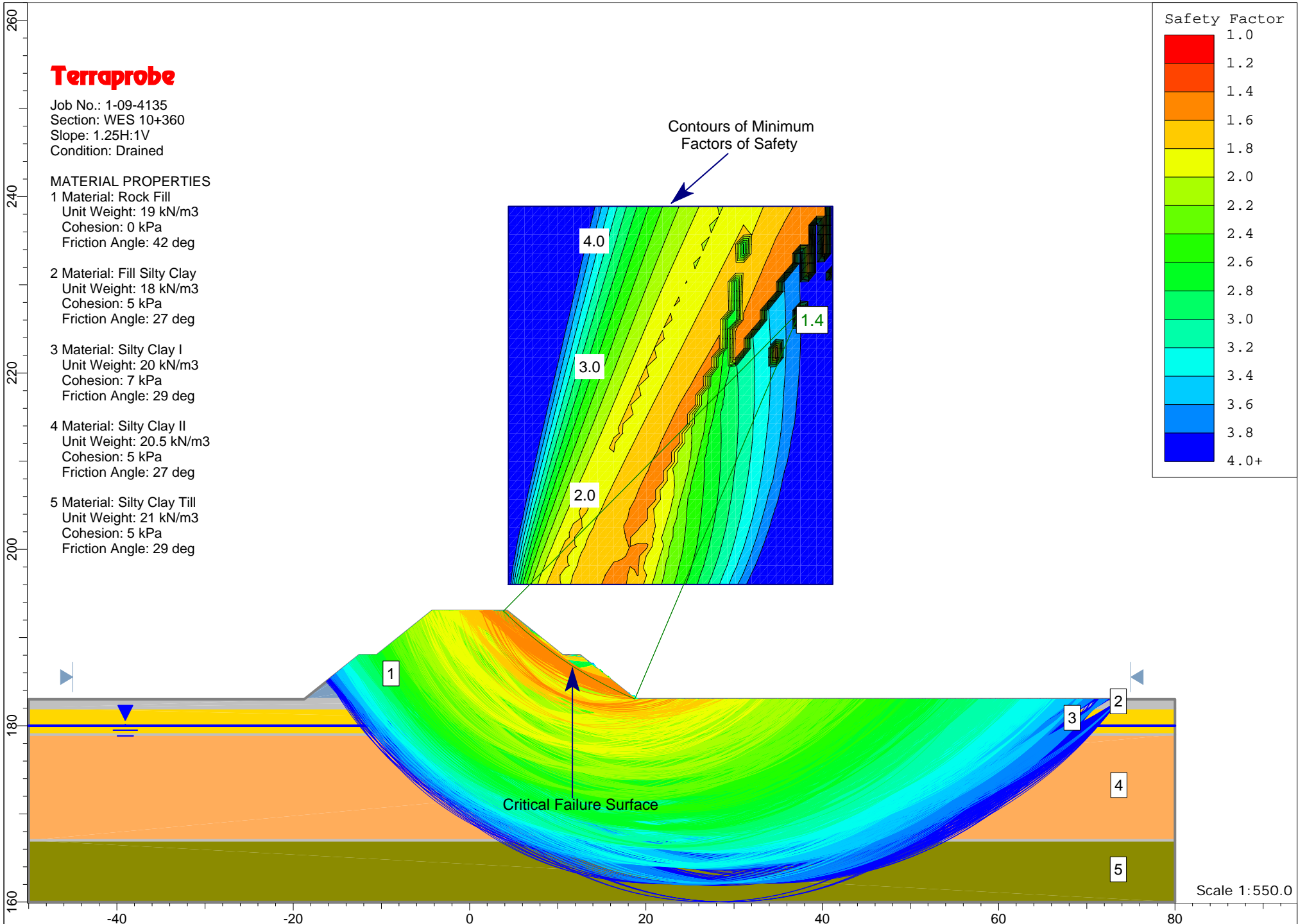
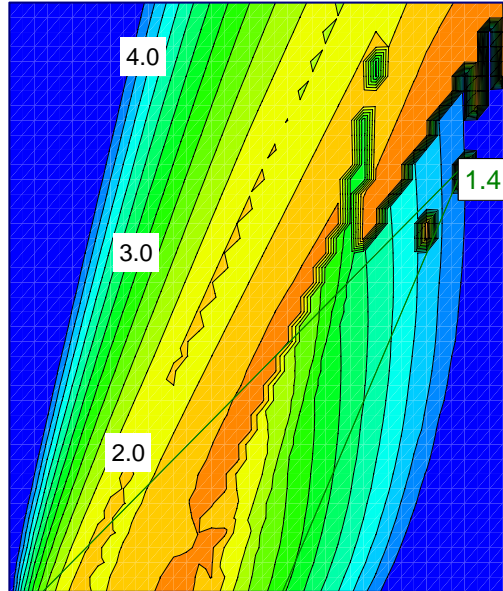
Job No.: 1-09-4135
Section: WES 10+360
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

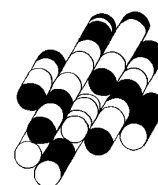


Contours of Minimum
Factors of Safety



D4

TERRAPROBE INC.



Terraprobe

Job No.: 1-09-4135
Section: SBL 12+260
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

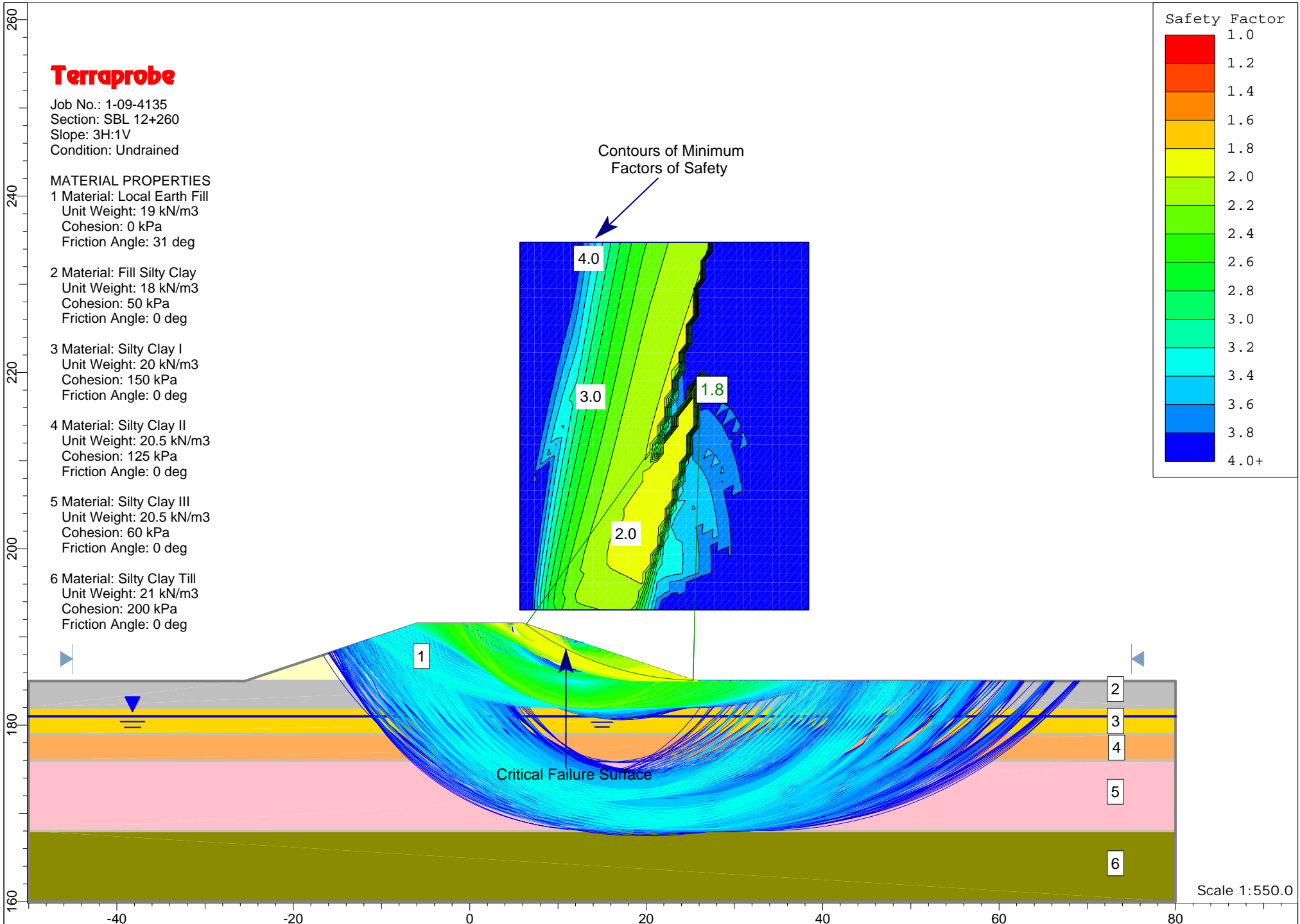
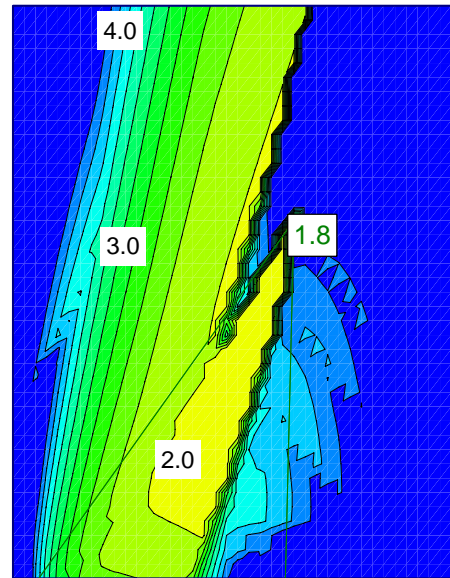
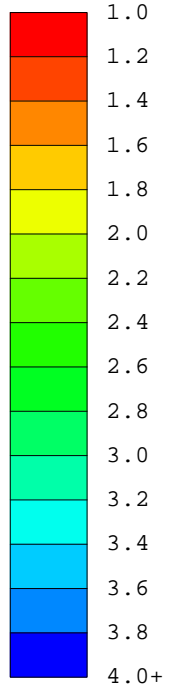
4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg

5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety

Safety Factor



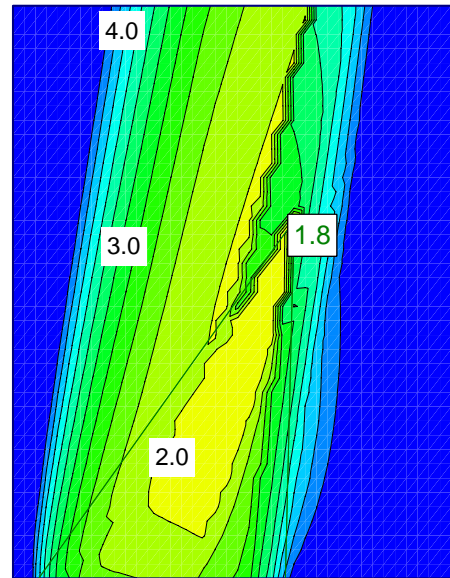
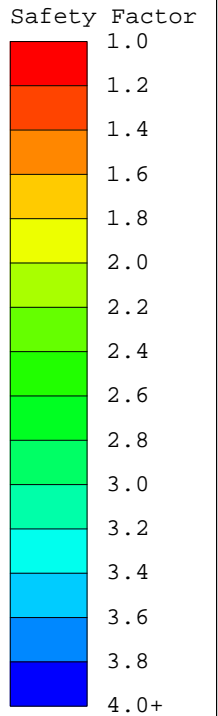
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+260
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+260
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg

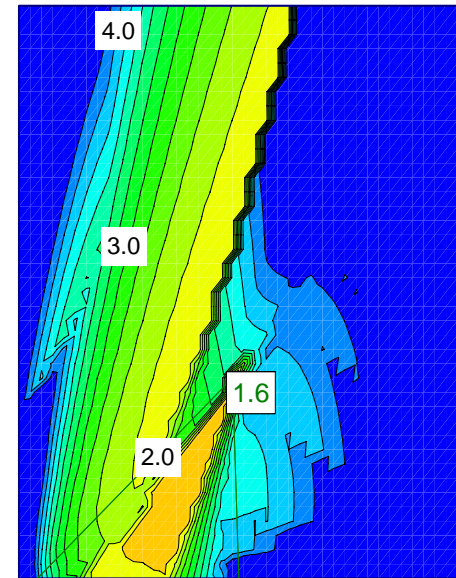
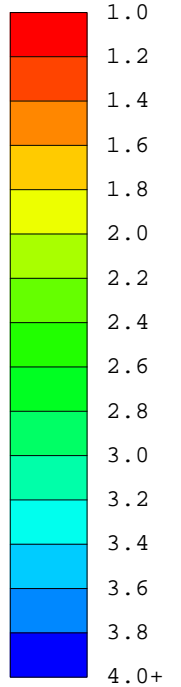
5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Critical Failure Surface

Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+260
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

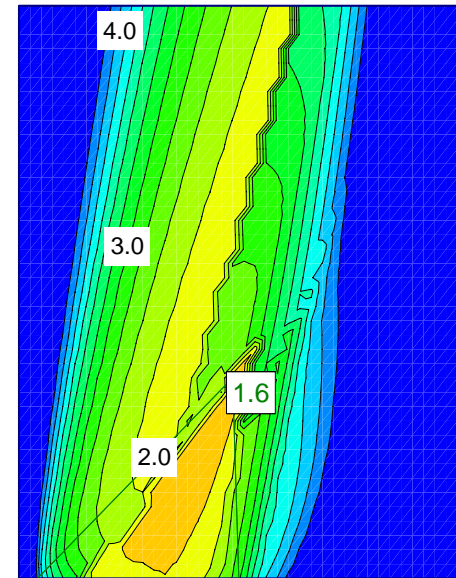
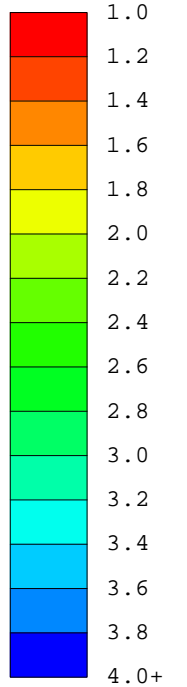
5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Critical Failure Surface

Scale 1:550.0

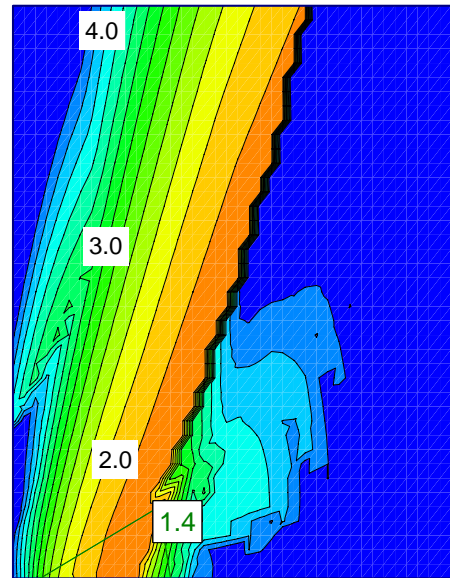
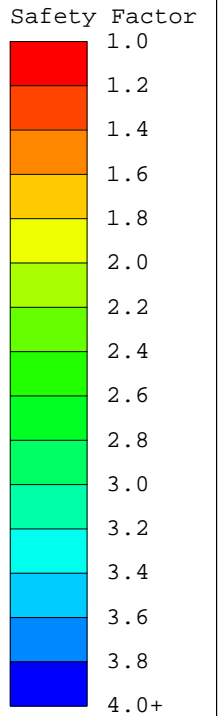
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+260
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

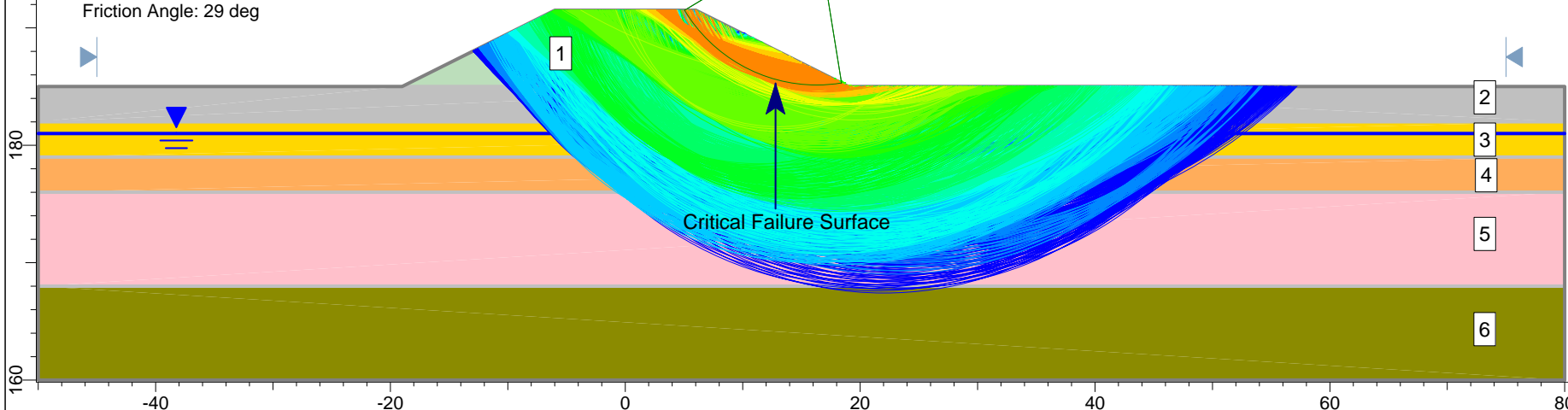
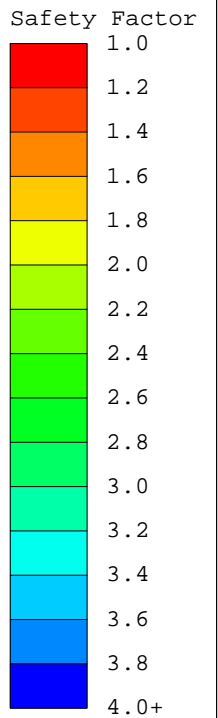
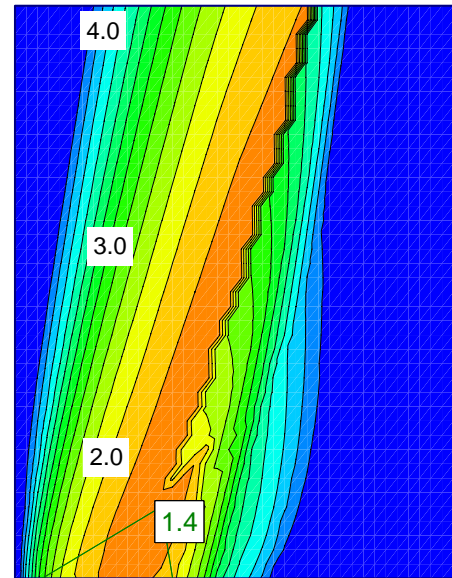
Job No.: 1-09-4135
Section: SBL 12+260
Slope: 2H:1V
Condition: Drained

Job No.: 1-09-4135
Section: SBL 12+260
Slope: 2H:1V
Condition: Drained

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum Factors of Safety



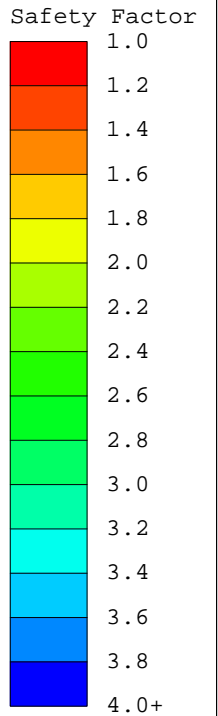
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Terraprobe

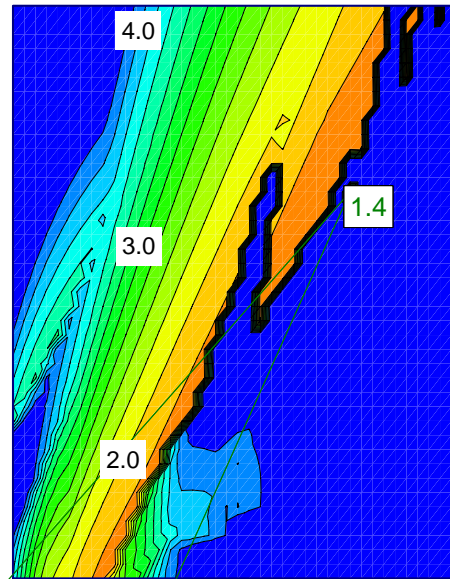
Job No.: 1-09-4135
Section: SBL 12+260
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg



Contours of Minimum Factors of Safety



Critical Failure Surface

Scale 1:550.0

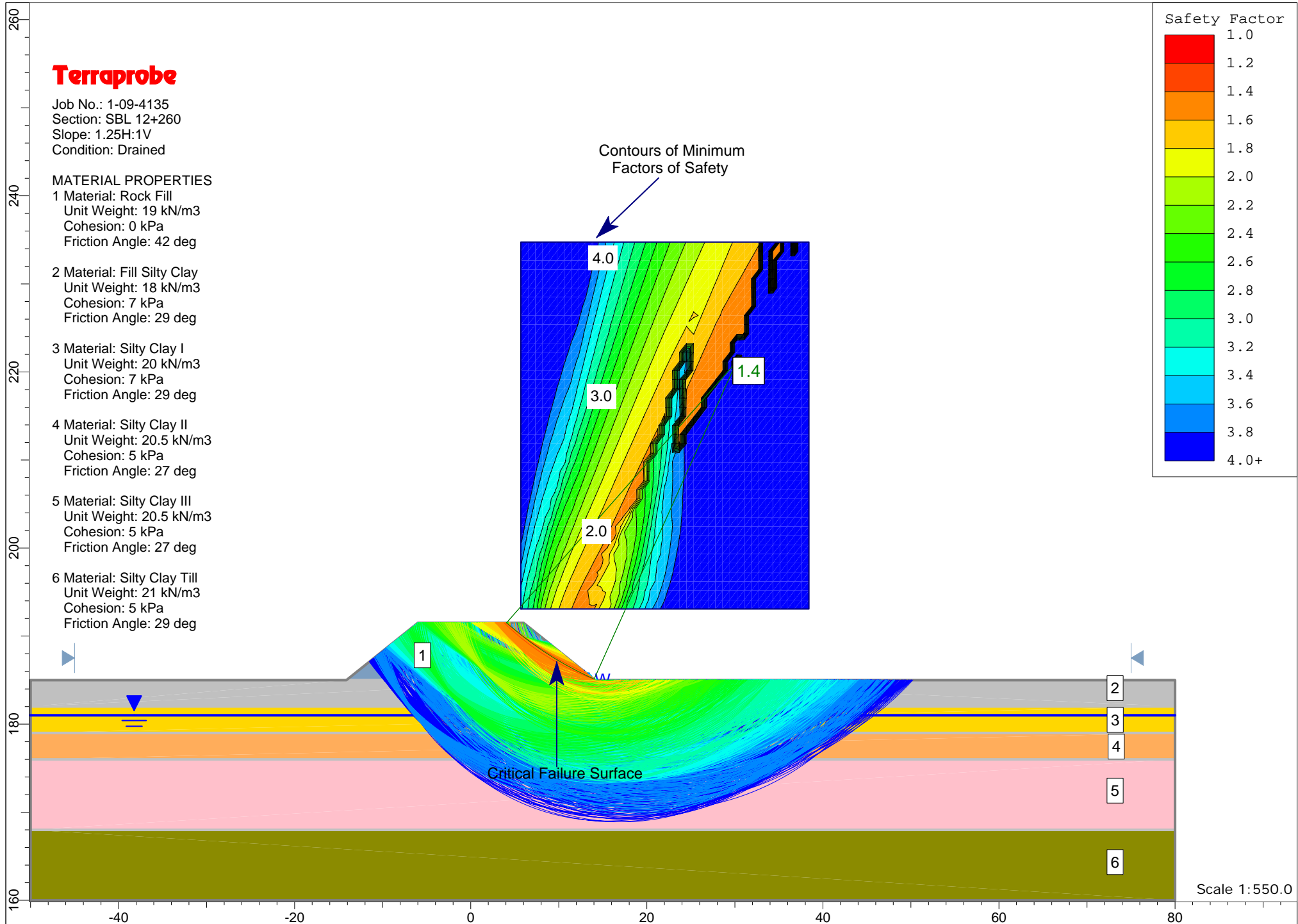
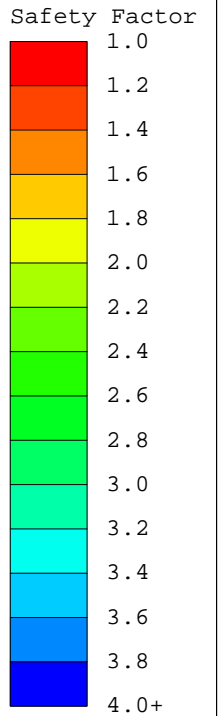
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+260
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety



Job No.: 1-09-4135
Section: NBL 12+300
Slope: 3H:1V
Condition: Undrained

Job No.: 1-09-4135
Section: NBL 12+300
Slope: 3H:1V
Condition: Undrained

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg

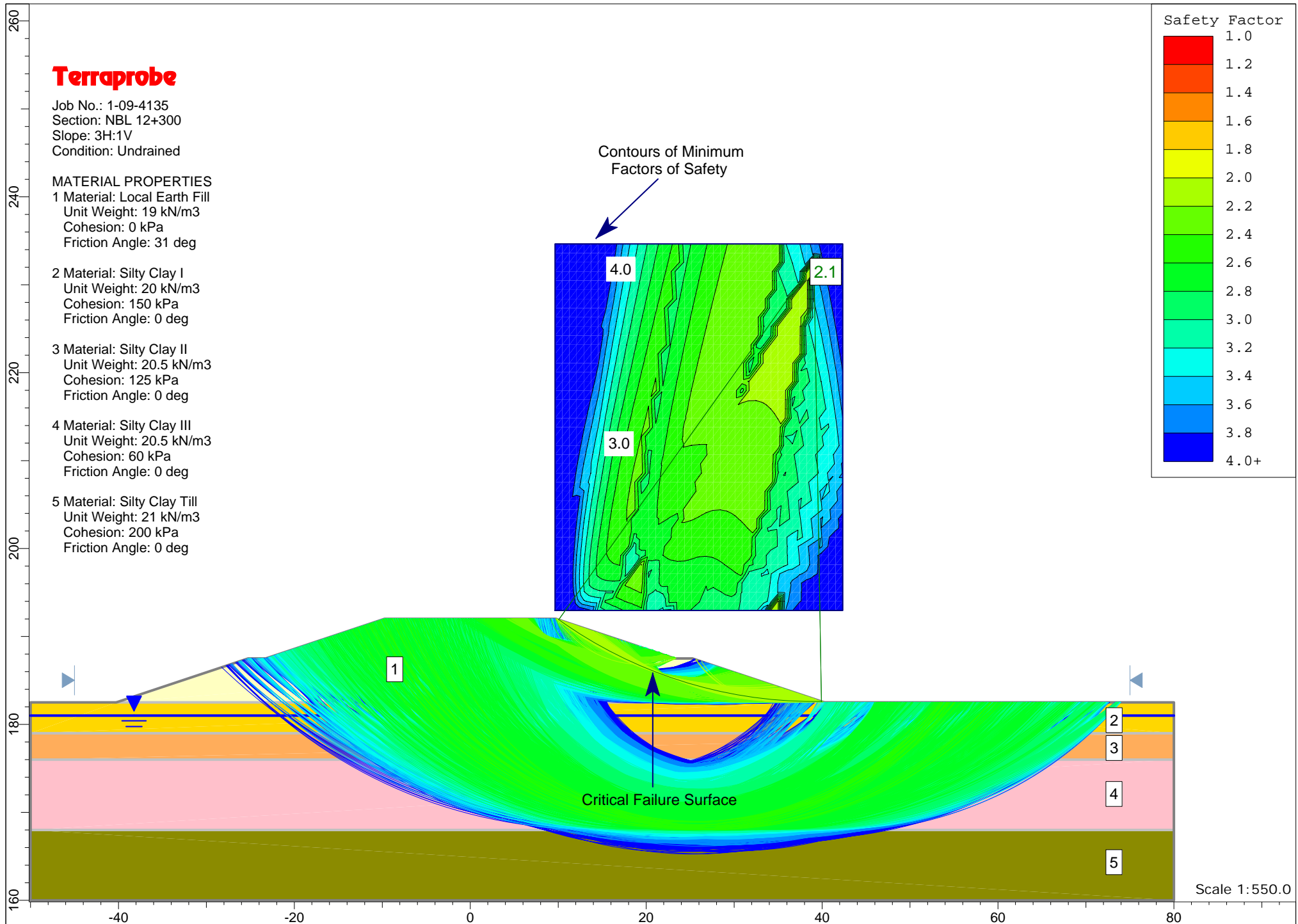
3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

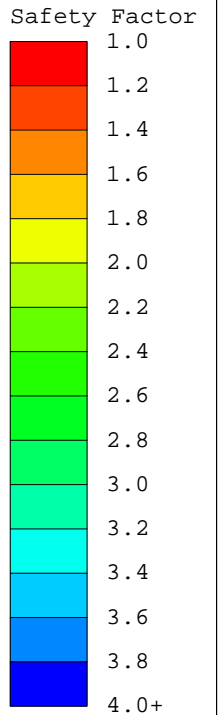


Terraprobe

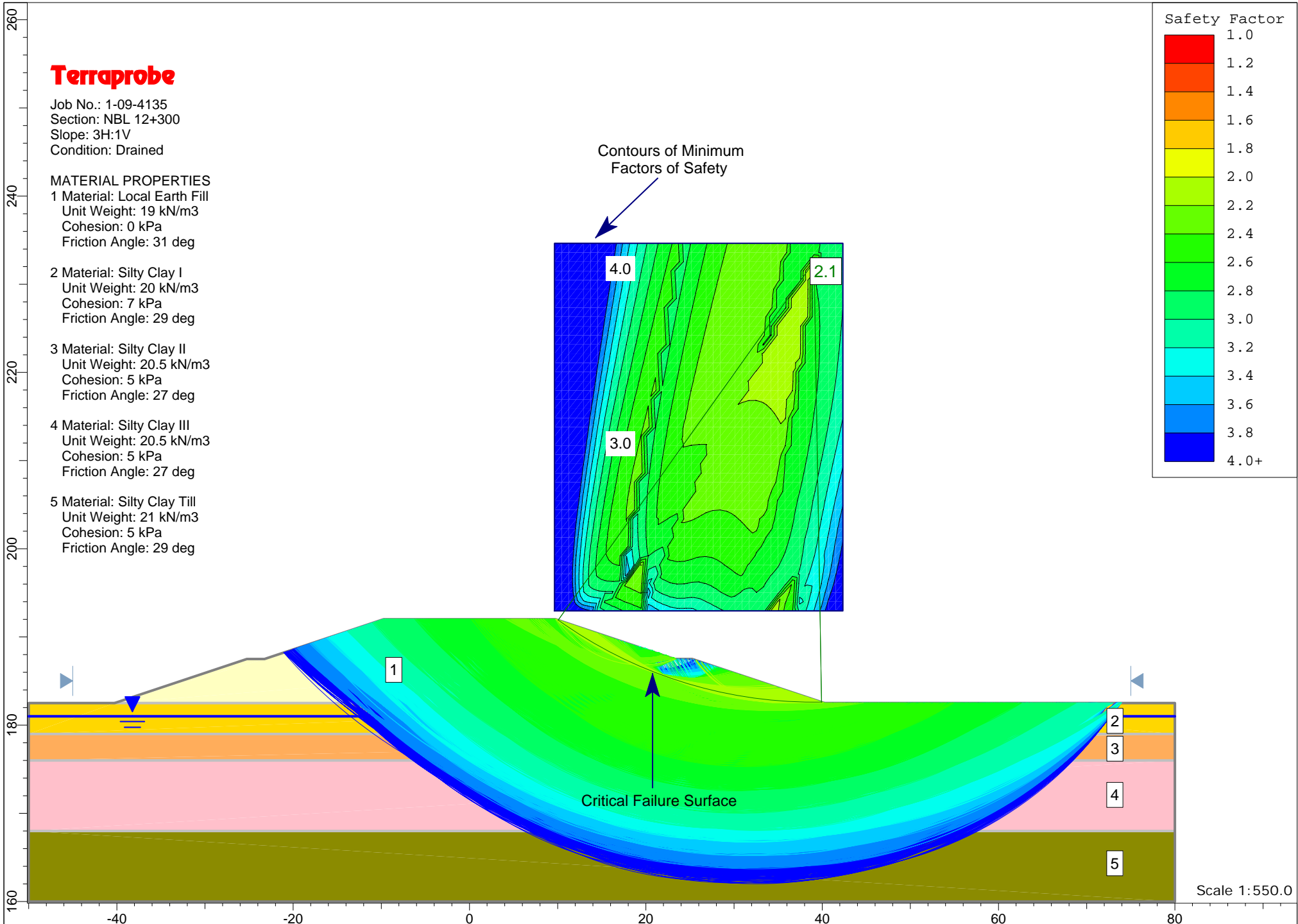
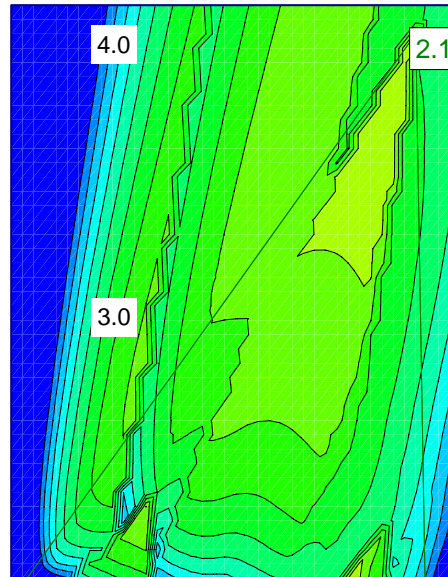
Job No.: 1-09-4135
Section: NBL 12+300
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



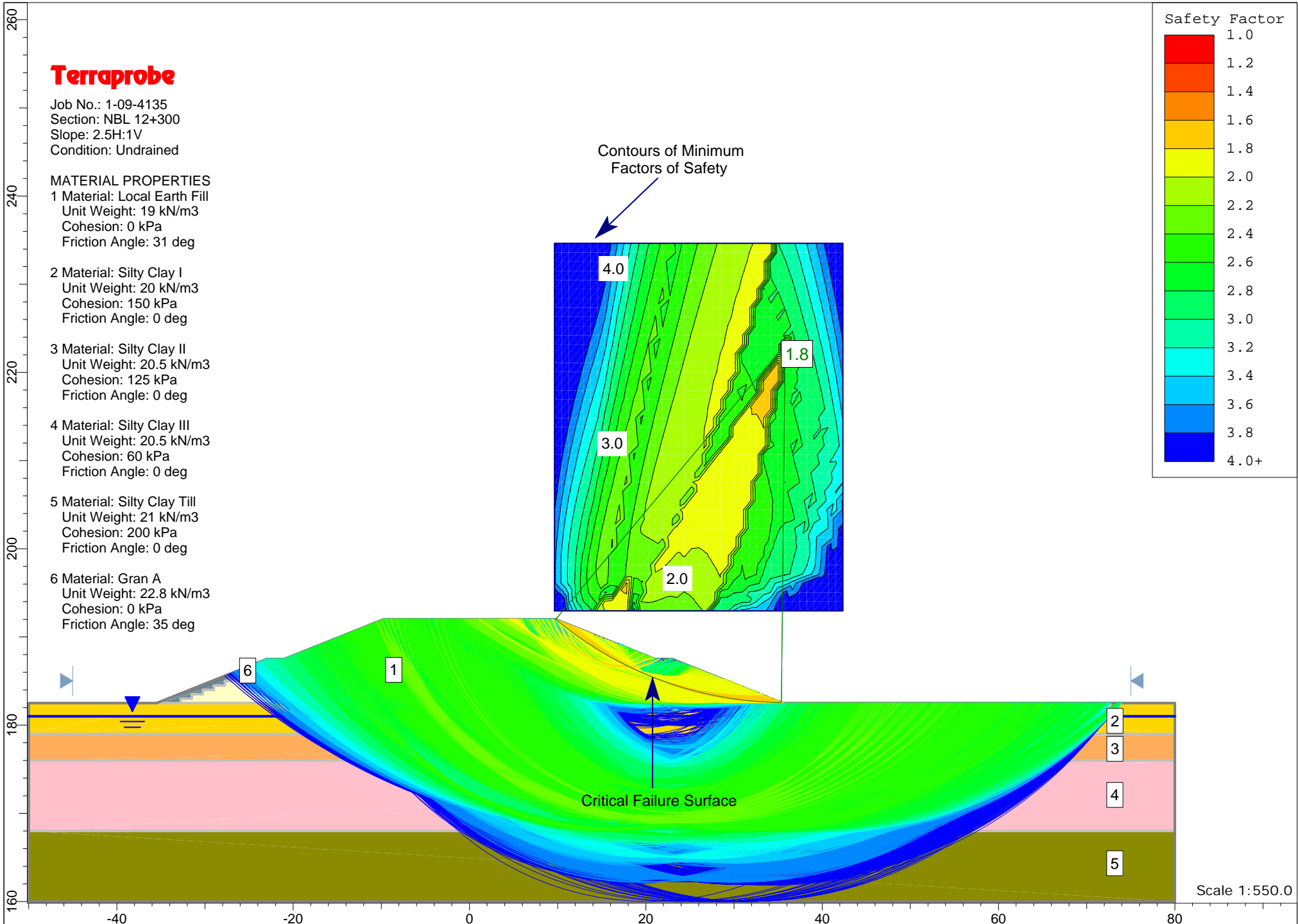
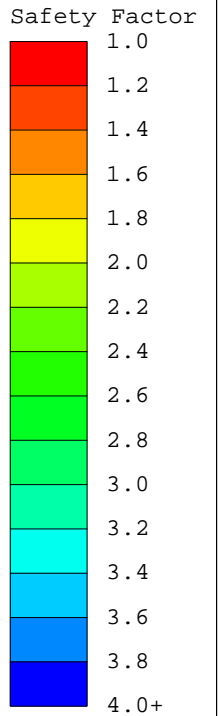
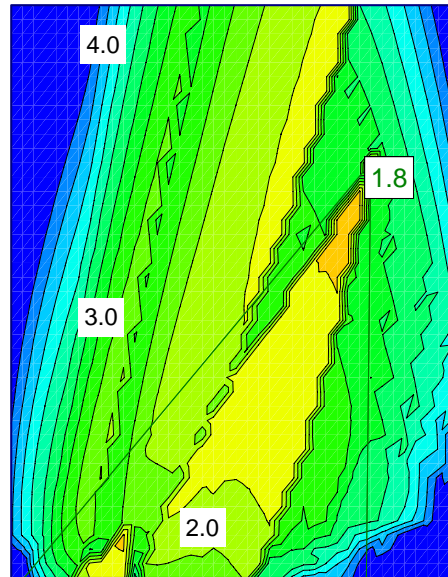
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+300
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



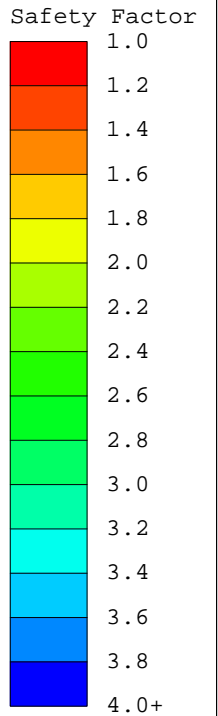
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Terraprobe

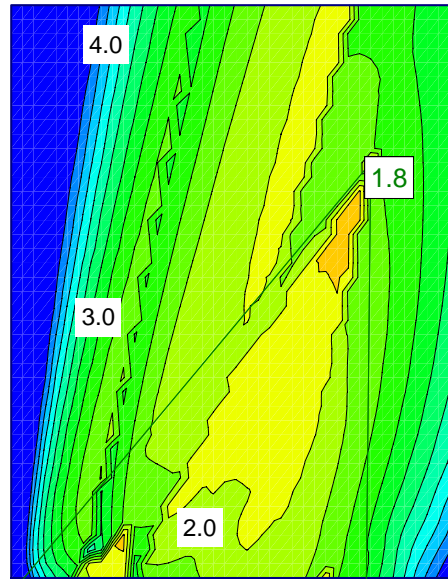
Job No.: 1-09-4135
Section: NBL 12+300
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

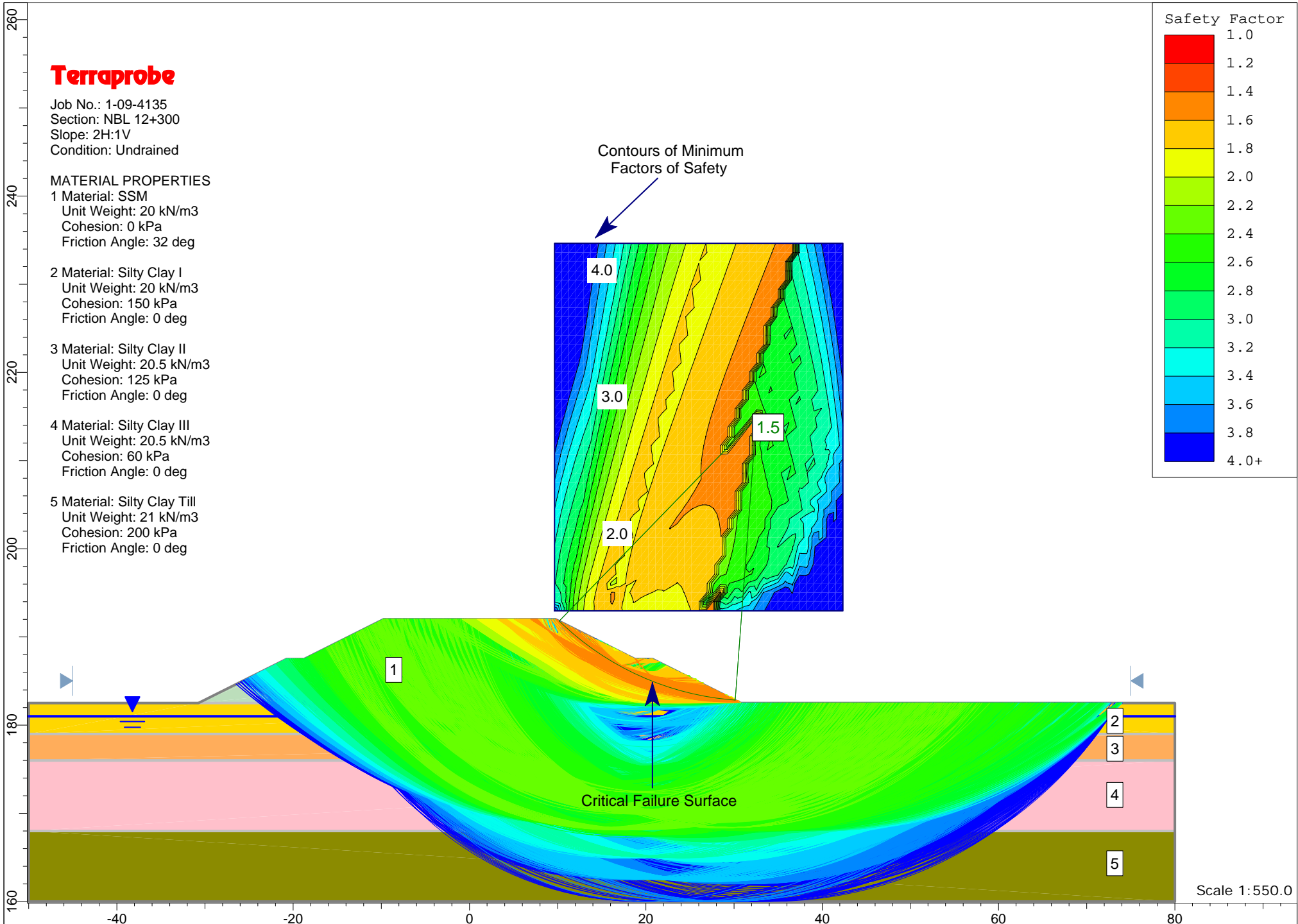
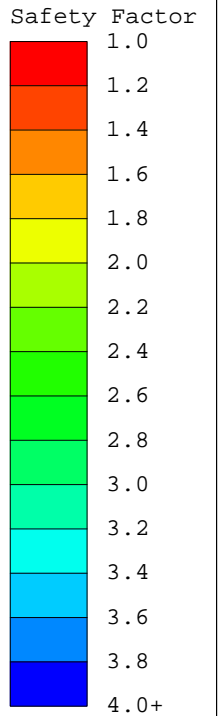
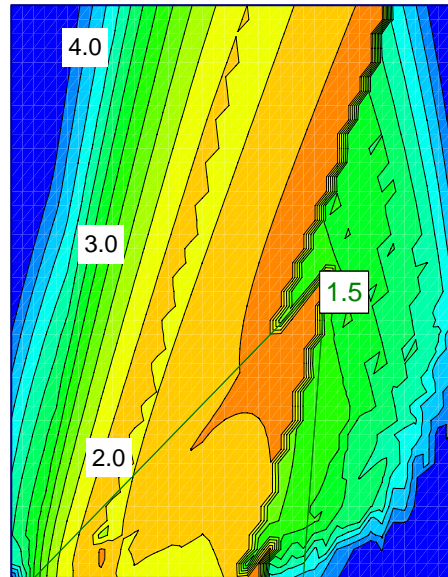
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+300
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety

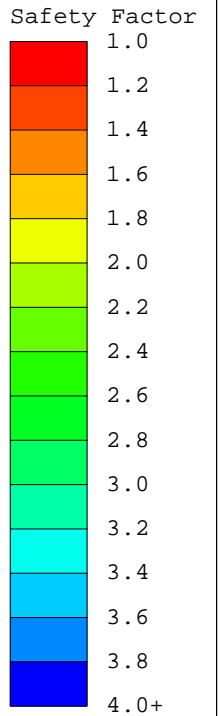


Terraprobe

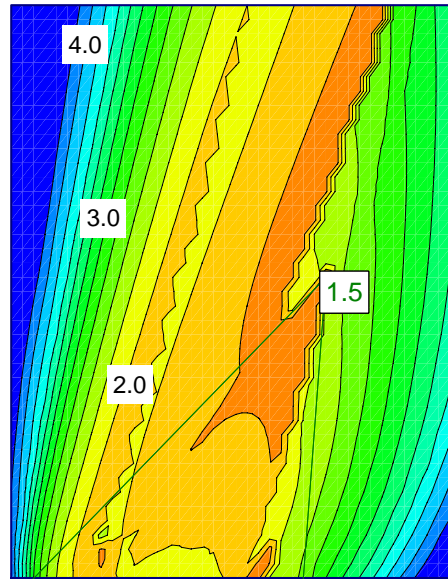
Job No.: 1-09-4135
Section: NBL 12+300
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

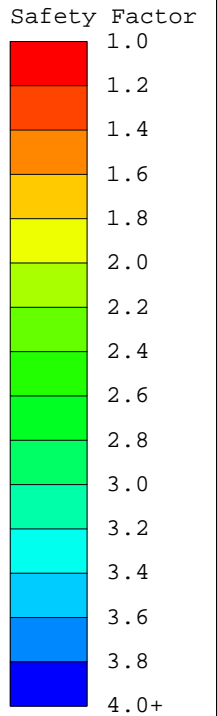
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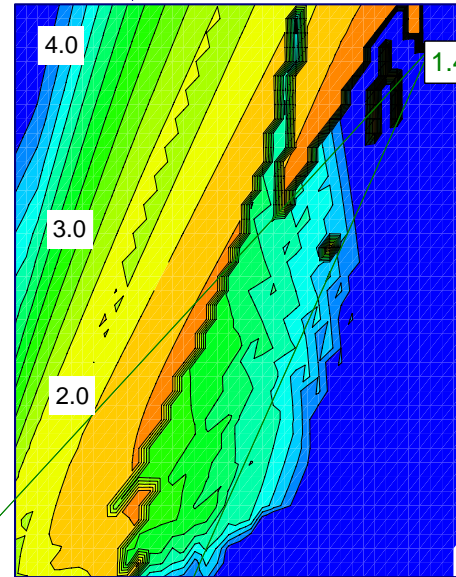
Job No.: 1-09-4135
Section: NBL 12+300
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg



Contours of Minimum Factors of Safety



Critical Failure Surface

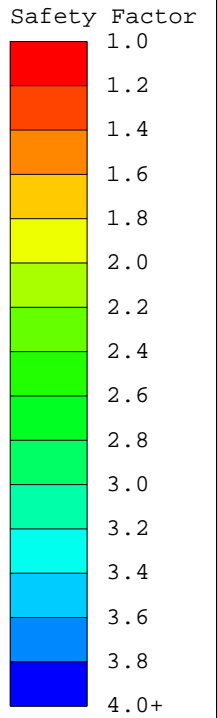
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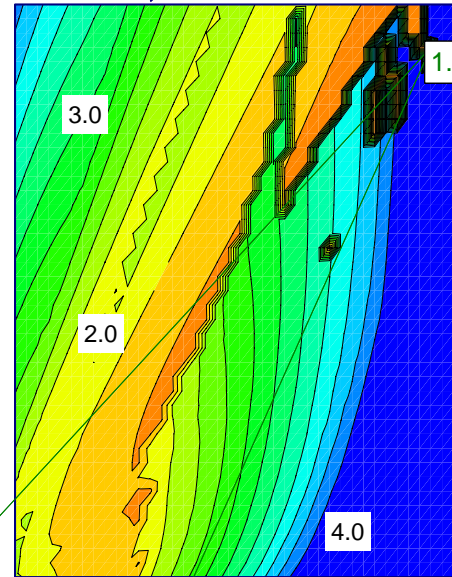
Job No.: 1-09-4135
Section: NBL 12+300
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum Factors of Safety



Critical Failure Surface

Scale 1:550.0

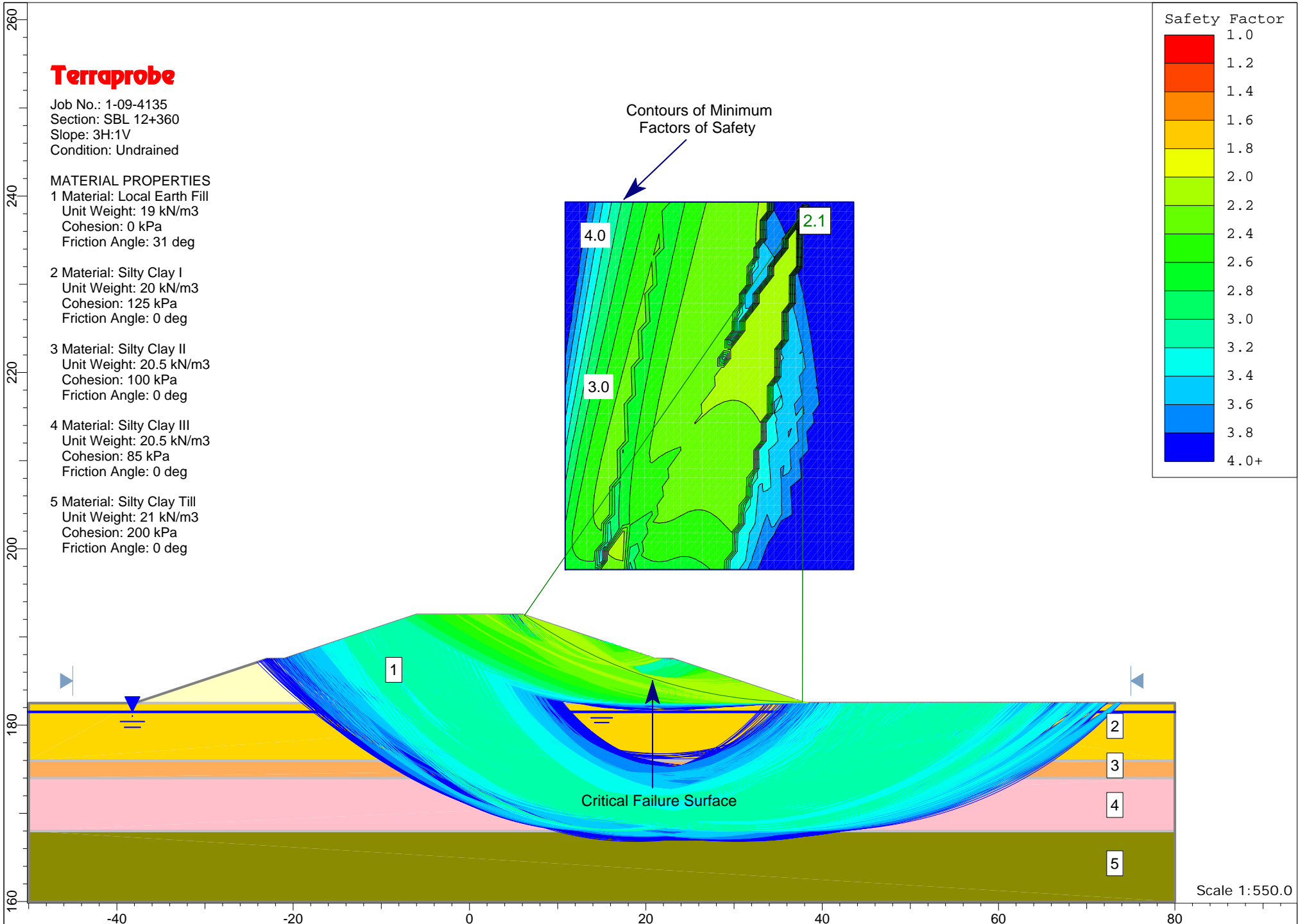
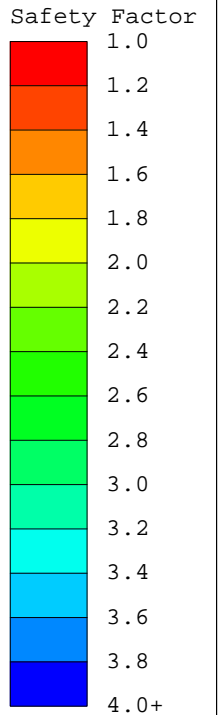
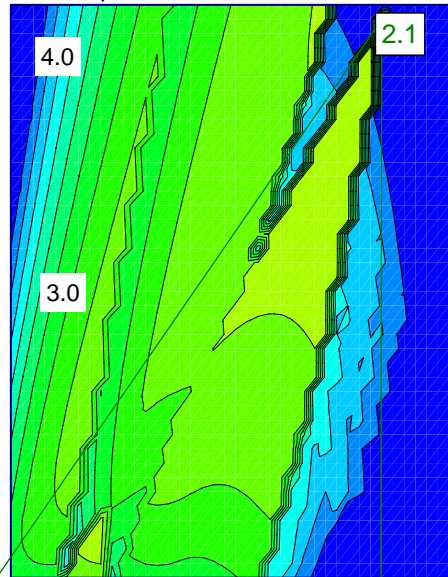
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+360
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety

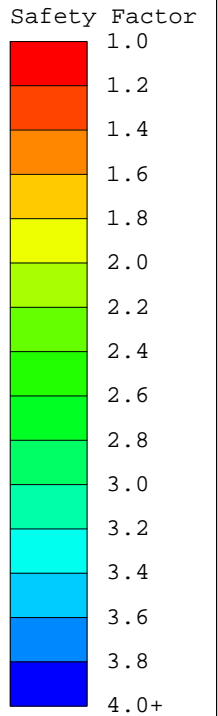


Terraprobe

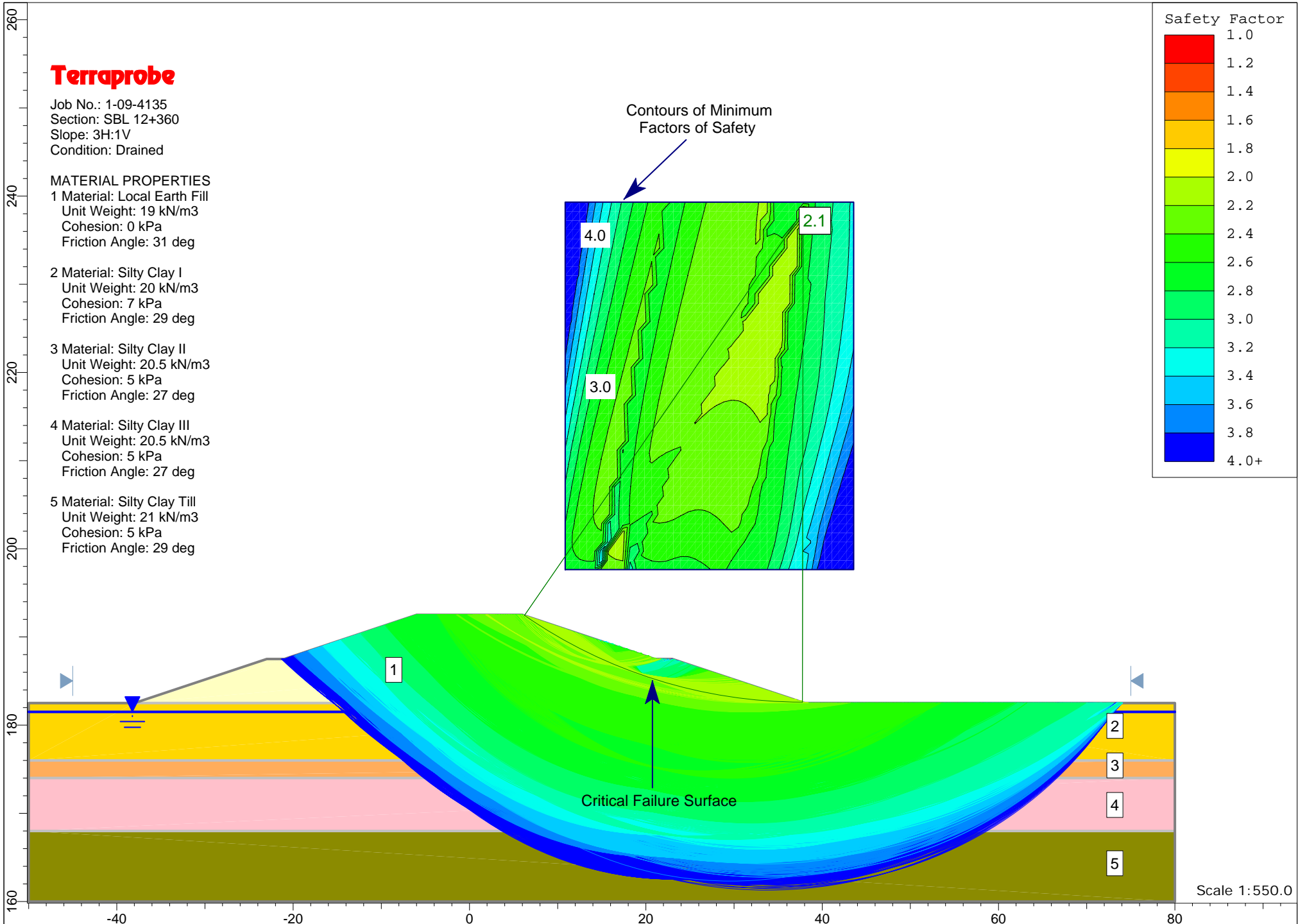
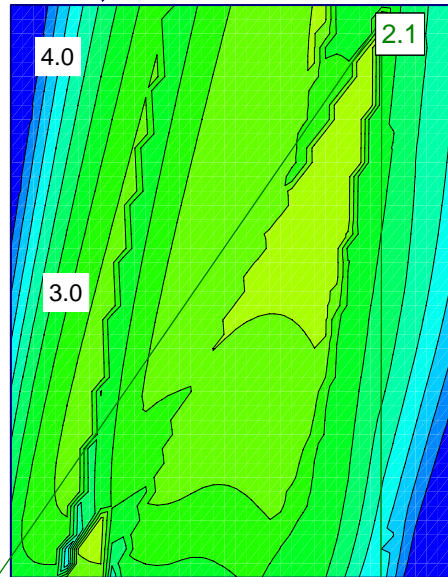
Job No.: 1-09-4135
Section: SBL 12+360
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



Terraprobe

Job No.: 1-09-4135
Section: SBL 12+360
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

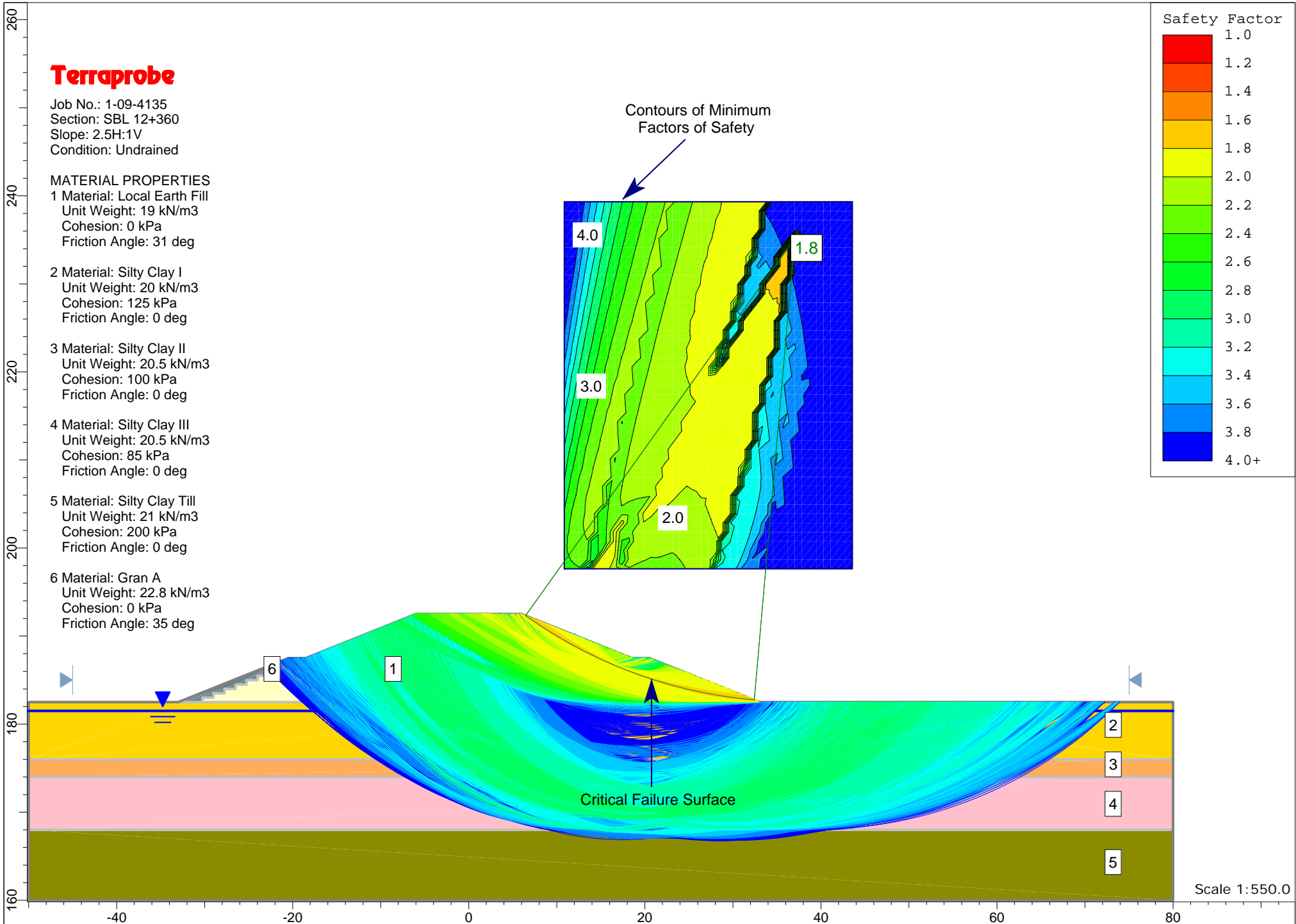
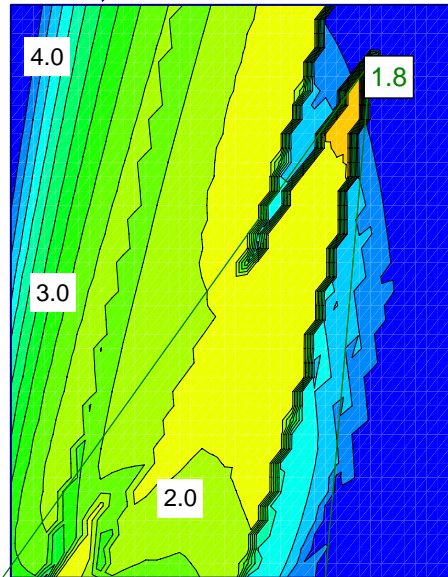
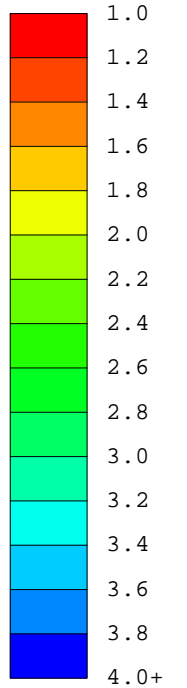
4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



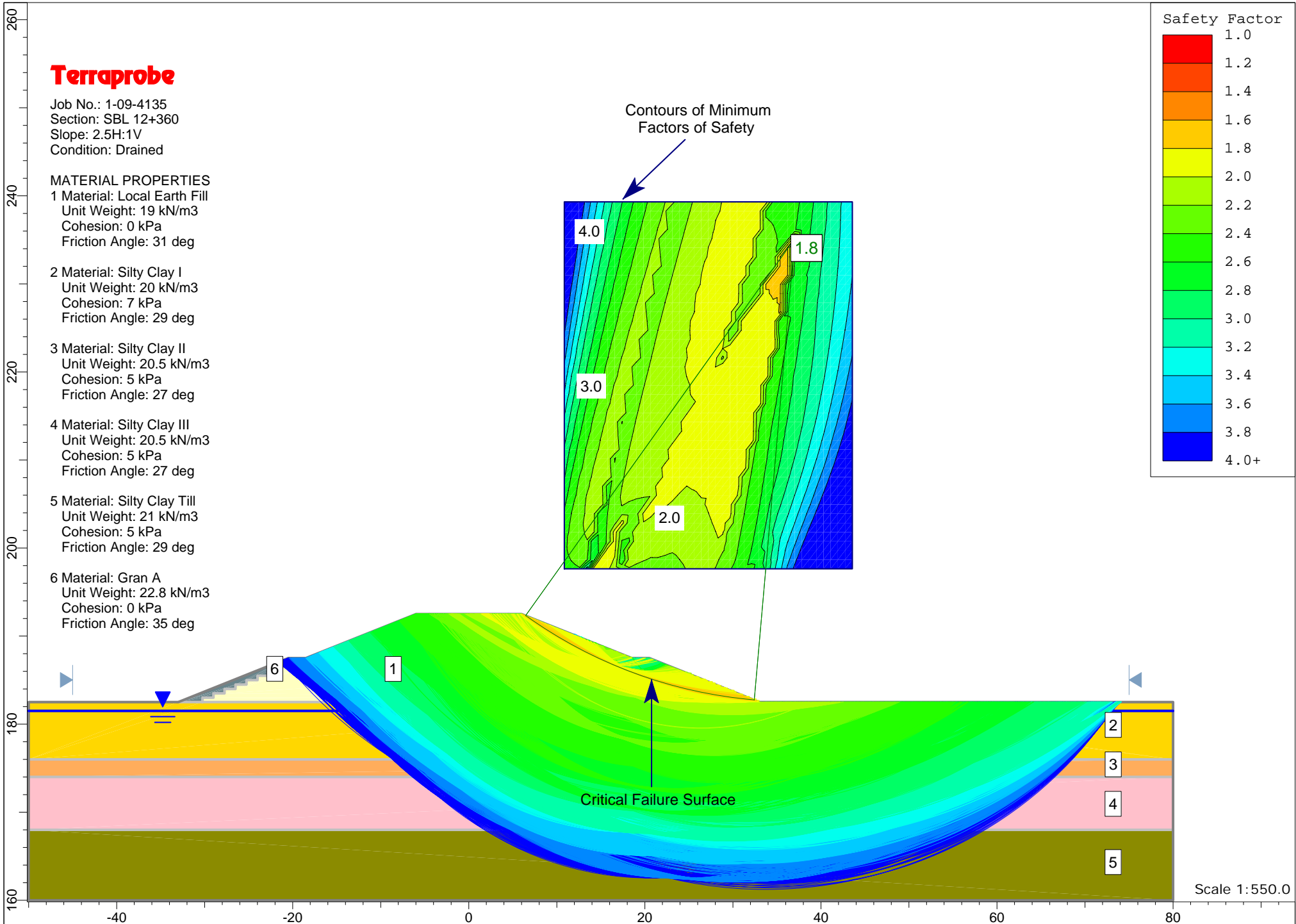
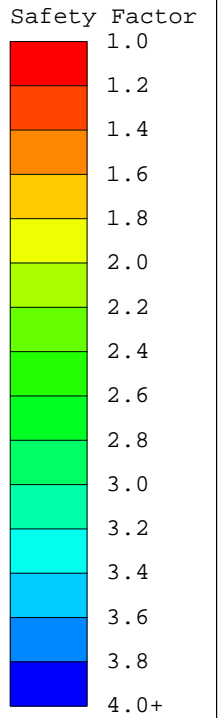
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+360
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

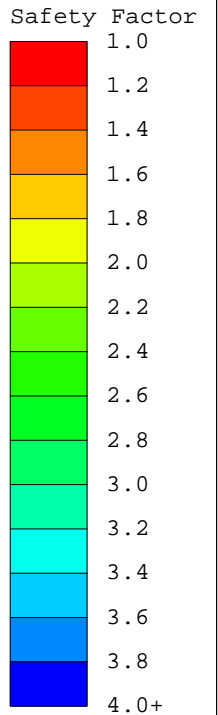


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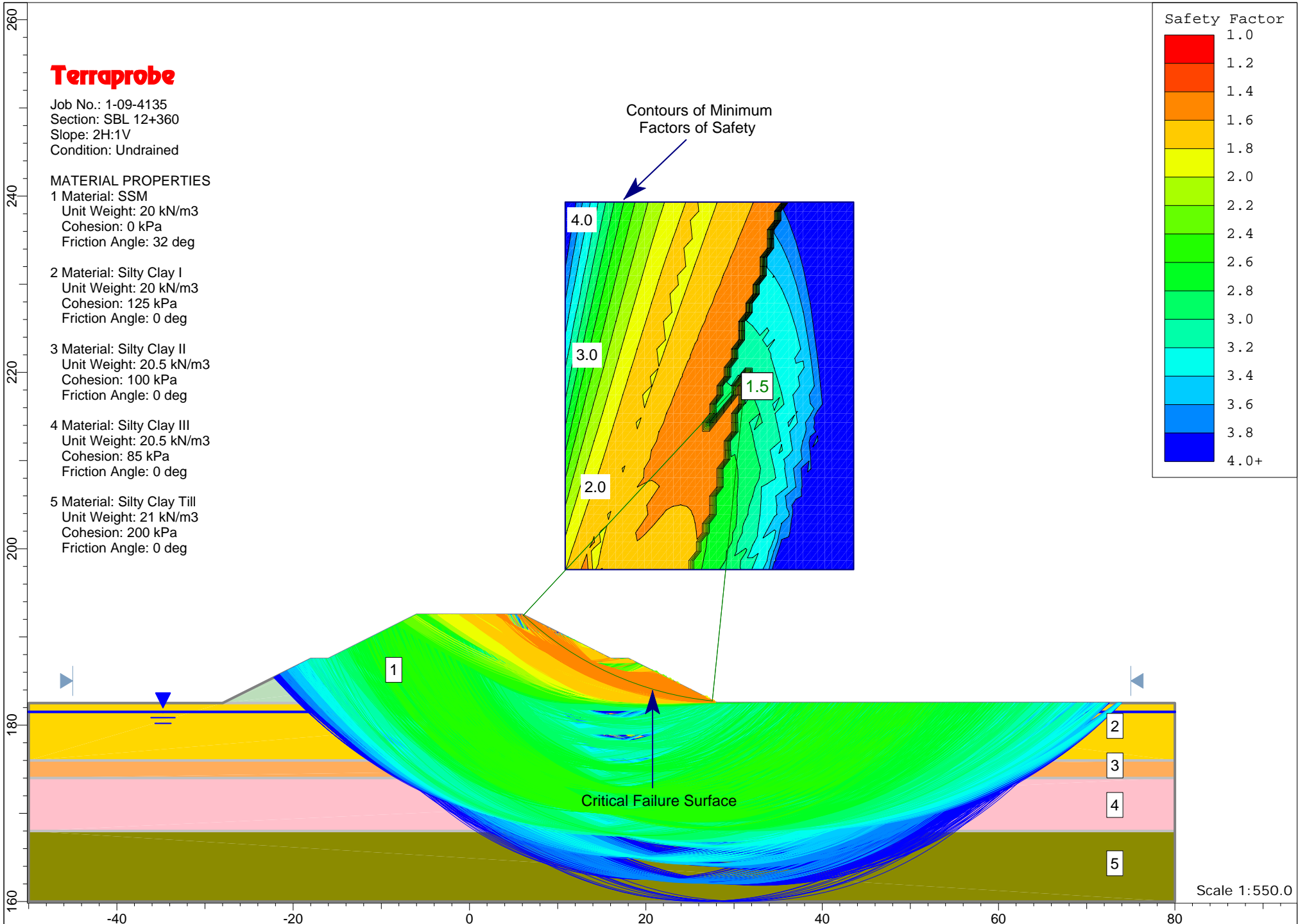
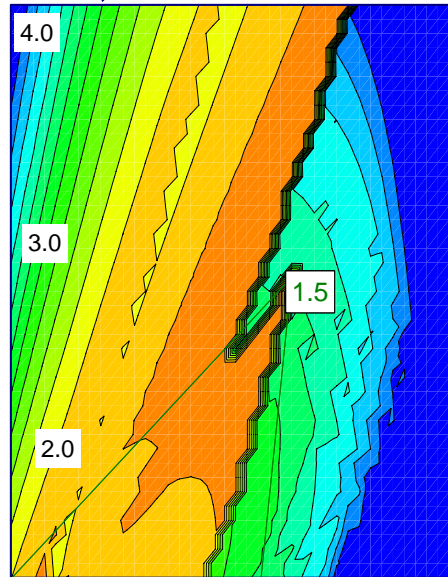
Job No.: 1-09-4135
Section: SBL 12+360
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg



Contours of Minimum
Factors of Safety

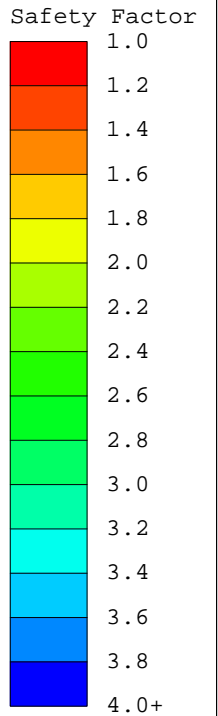


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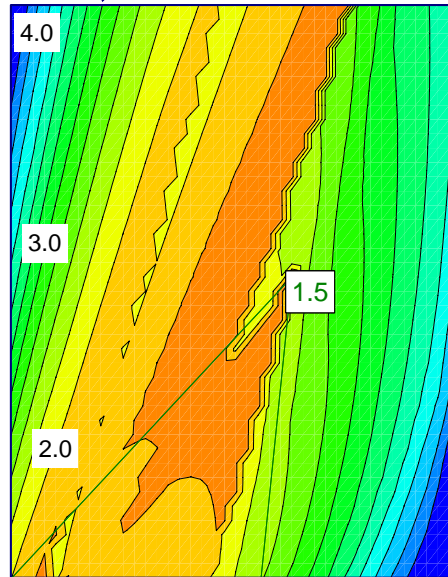
Job No.: 1-09-4135
Section: SBL 12+360
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

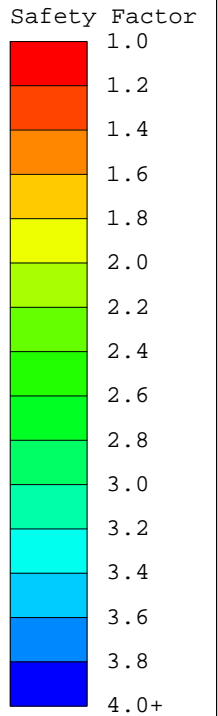
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Terraprobe

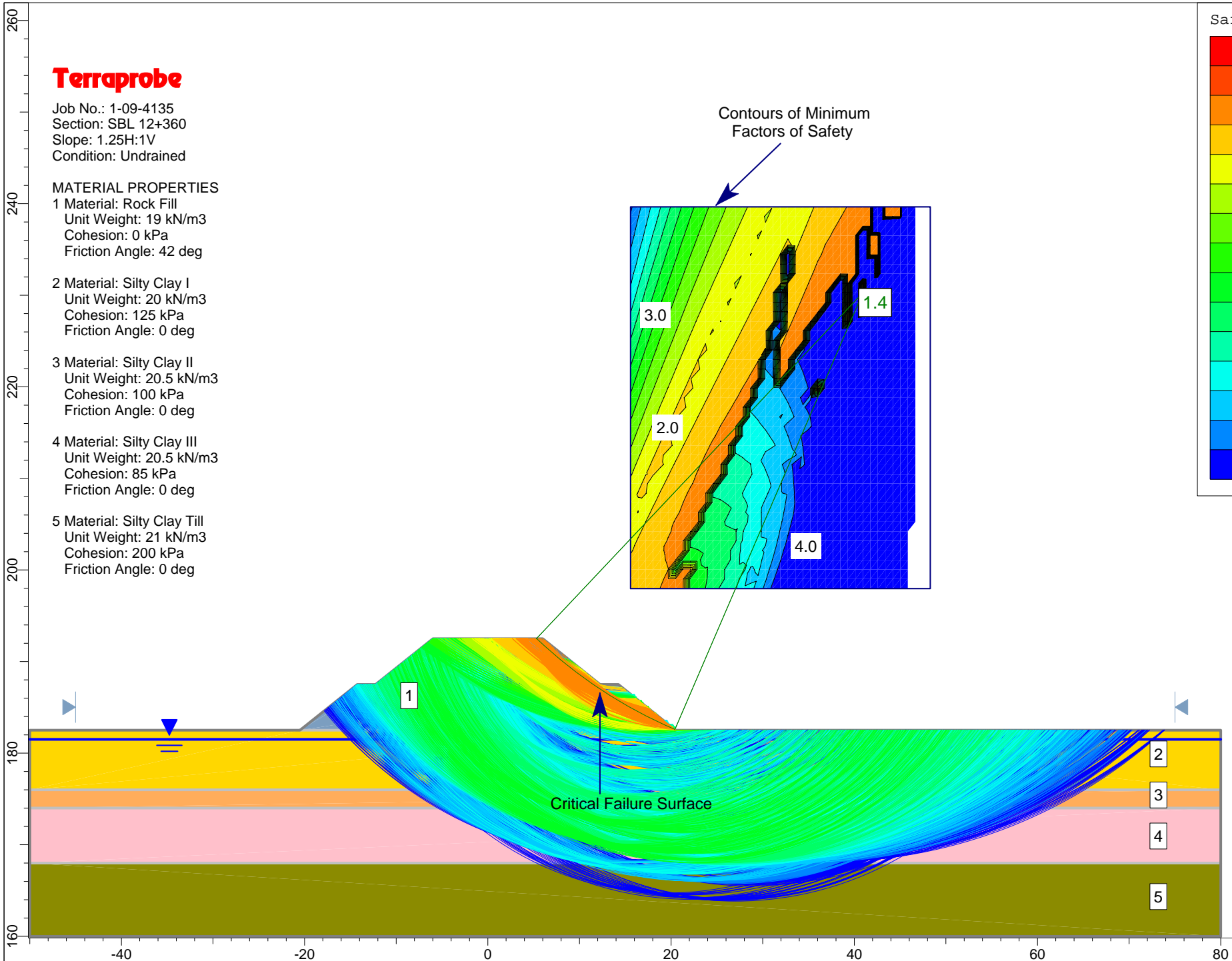
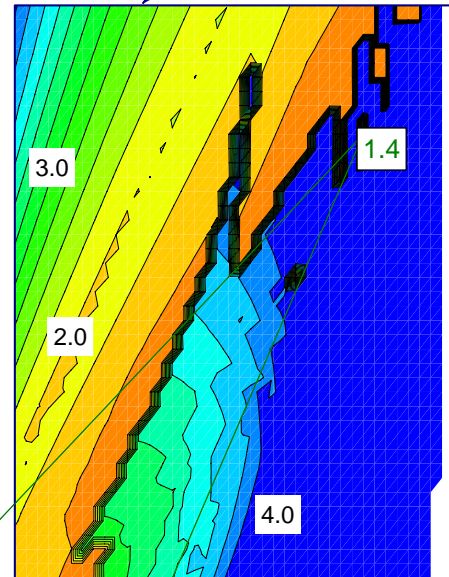
Job No.: 1-09-4135
Section: SBL 12+360
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg



Contours of Minimum Factors of Safety



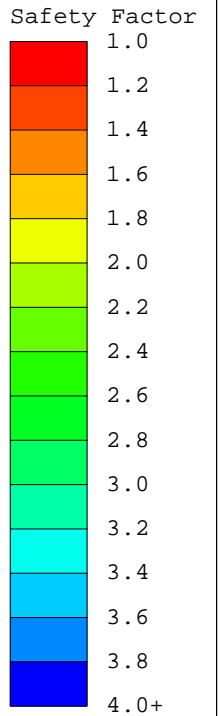
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Terraprobe

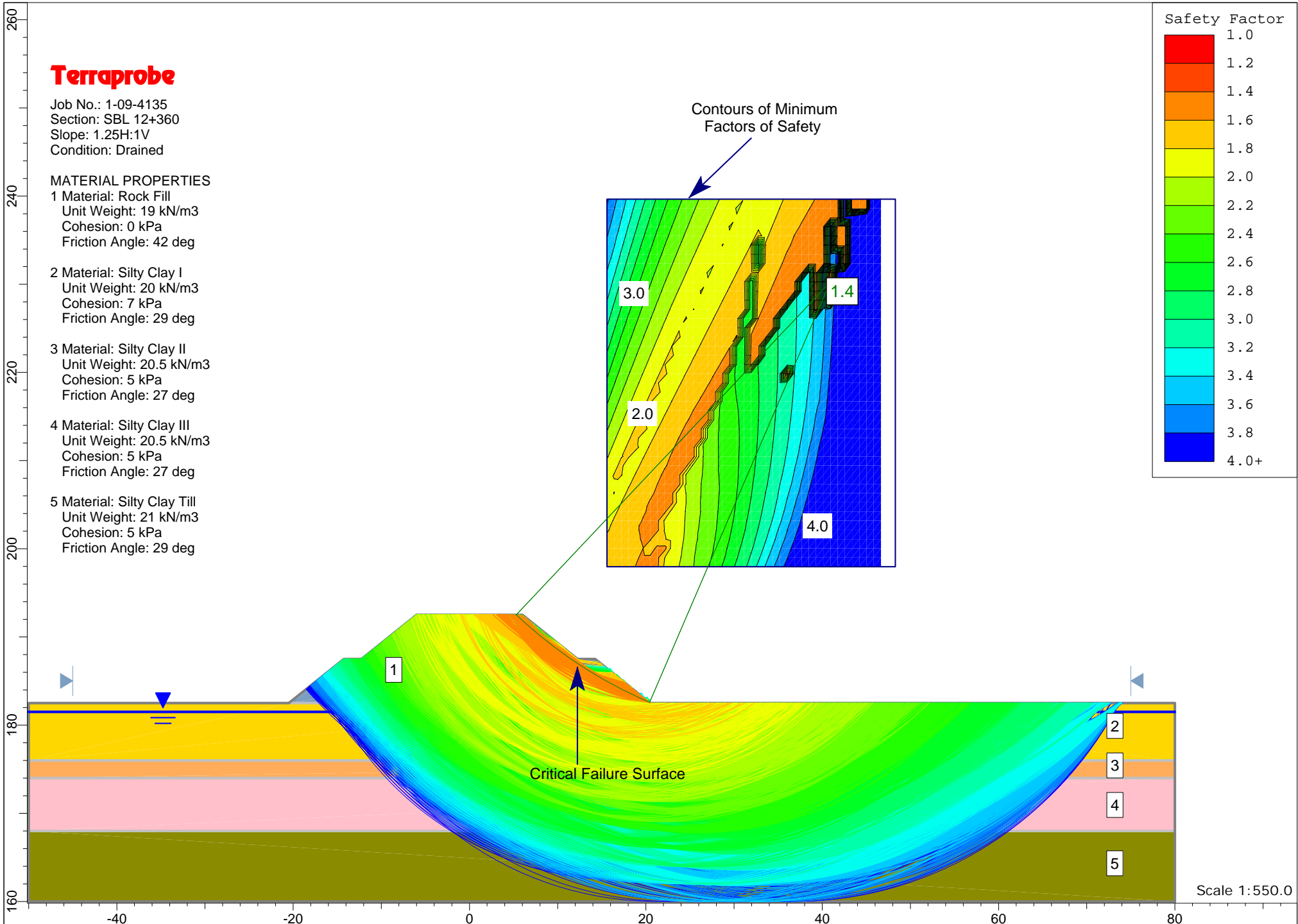
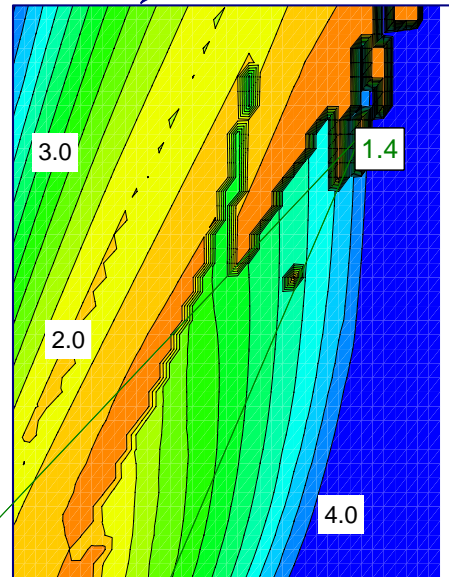
Job No.: 1-09-4135
Section: SBL 12+360
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum Factors of Safety



Terraprobe

Job No.: 1-09-4135
Section: NBL 12+375
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg

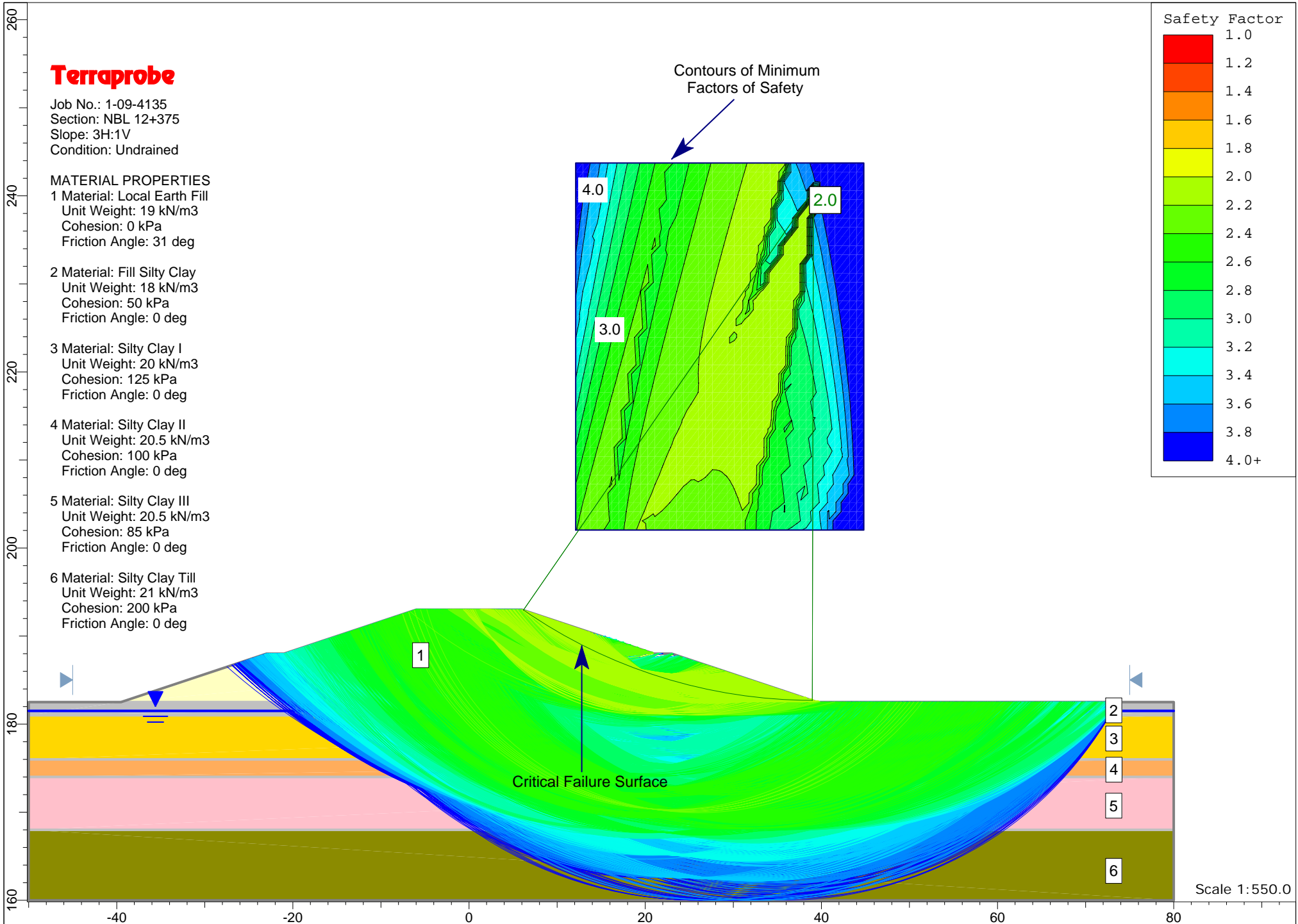
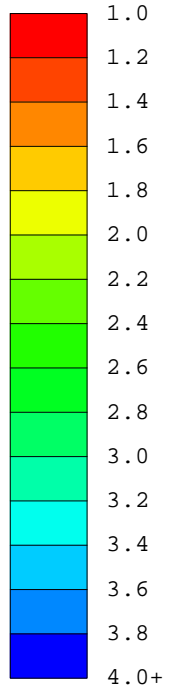
4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety

Safety Factor



Terraprobe

Job No.: 1-09-4135
Section: NBL 12+375
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

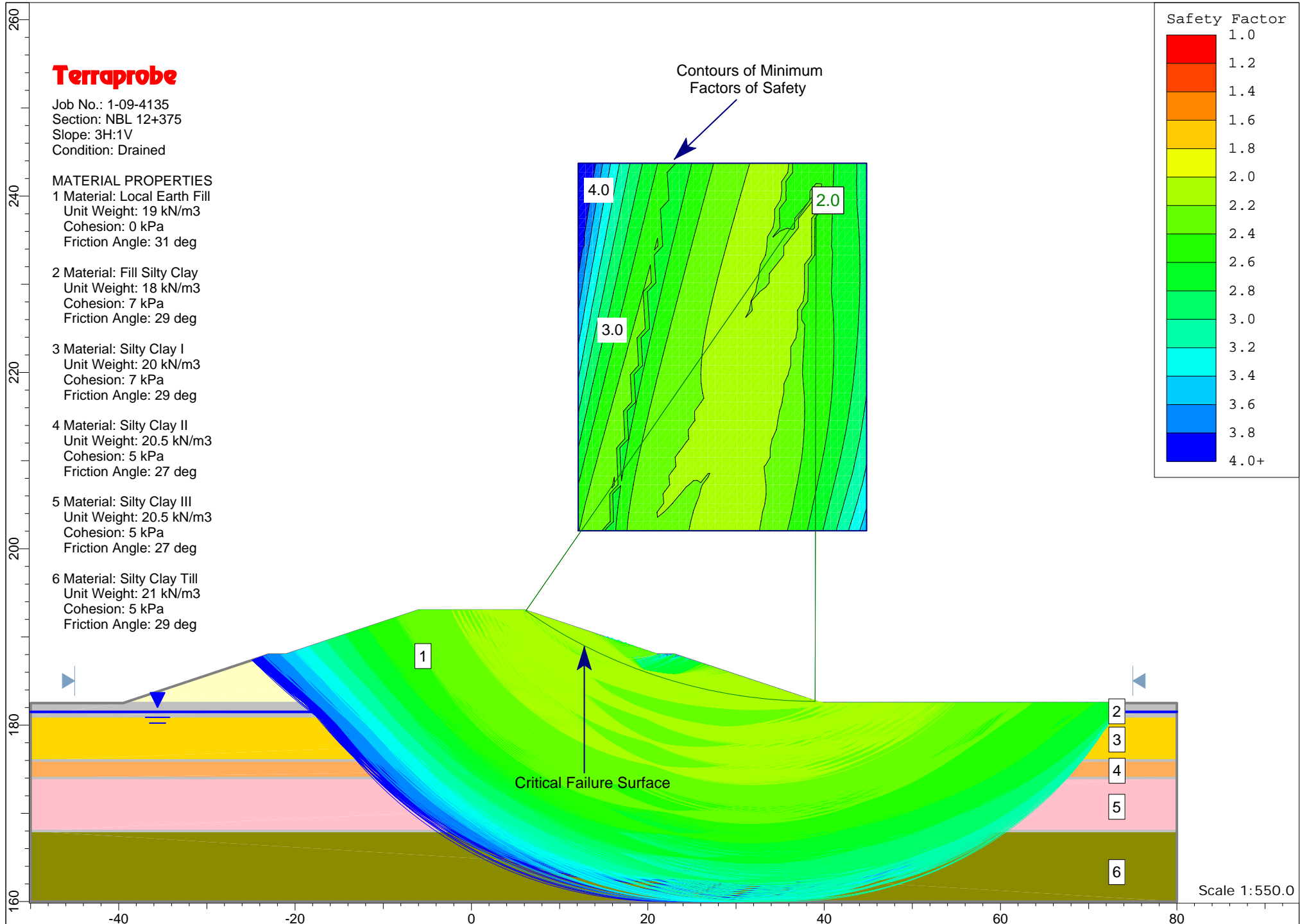
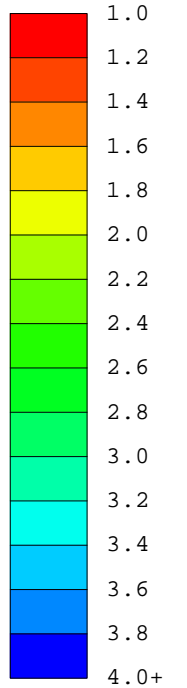
4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety

Safety Factor



Terraprobe

Job No.: 1-09-4135
Section: NBL 12+375
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg

4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

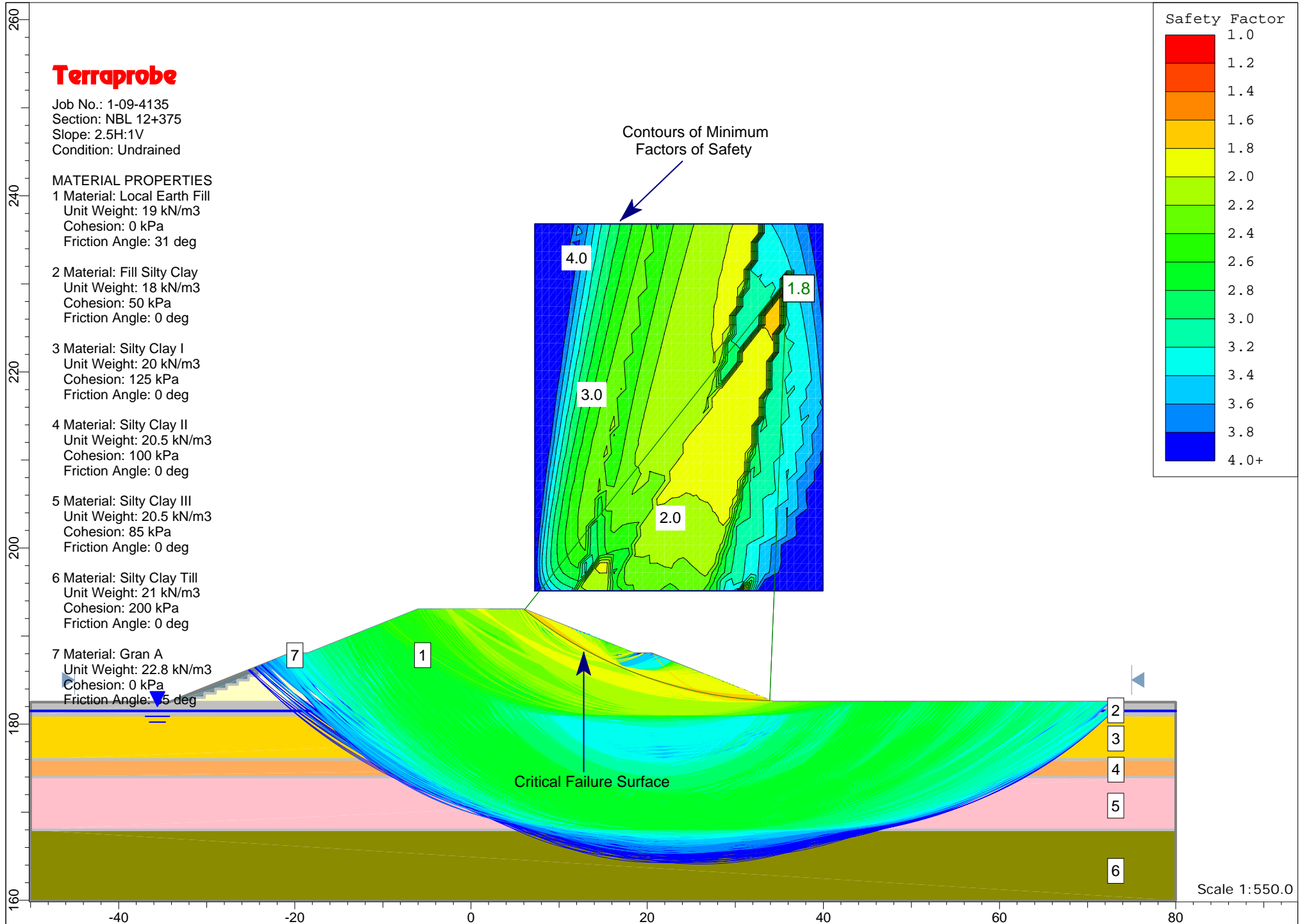
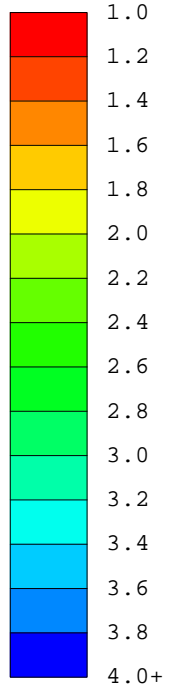
5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Terraprobe

Job No.: 1-09-4135
Section: NBL 12+375
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

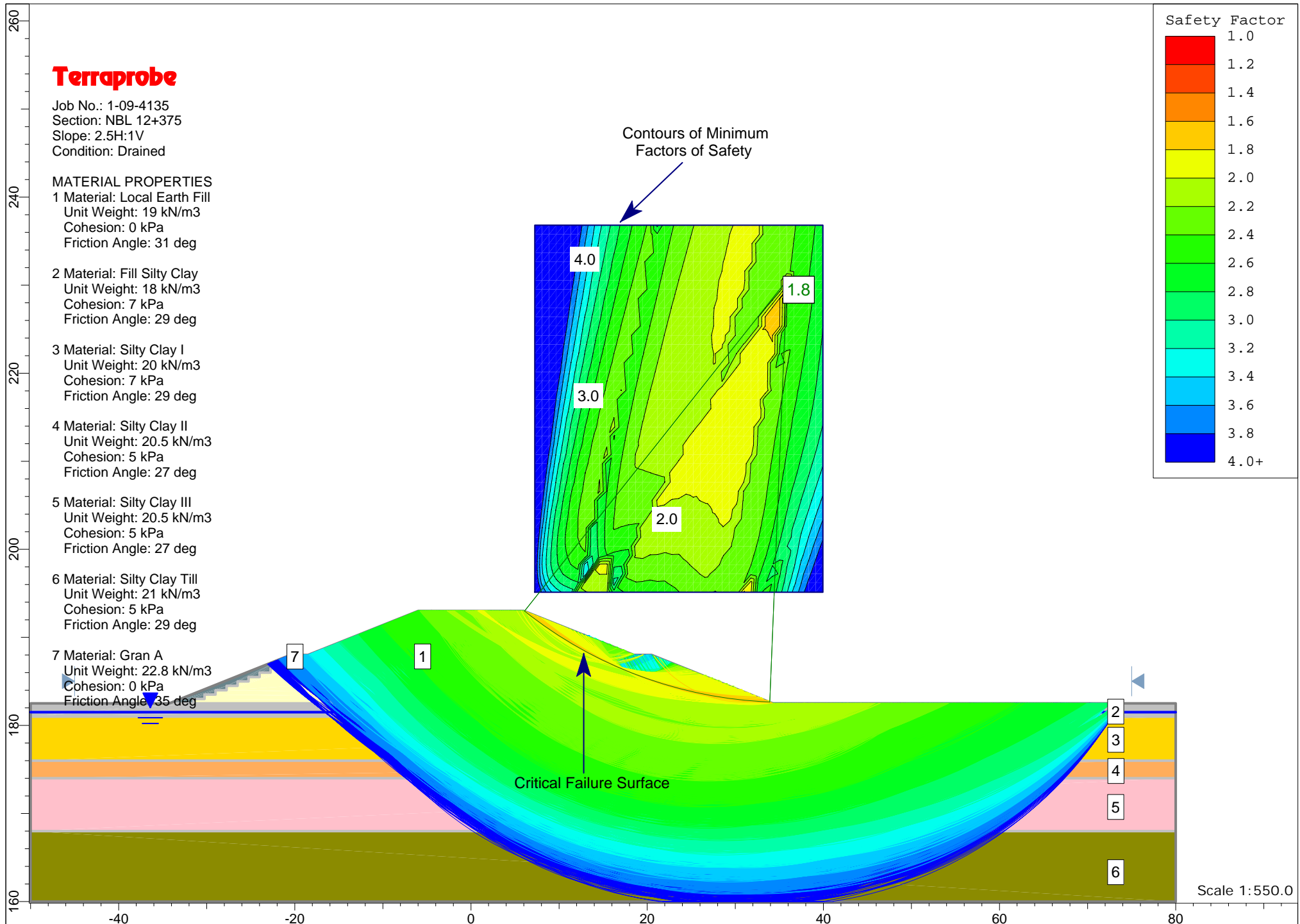
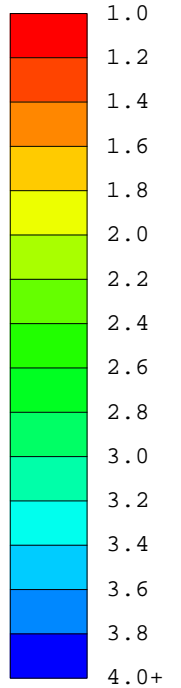
5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



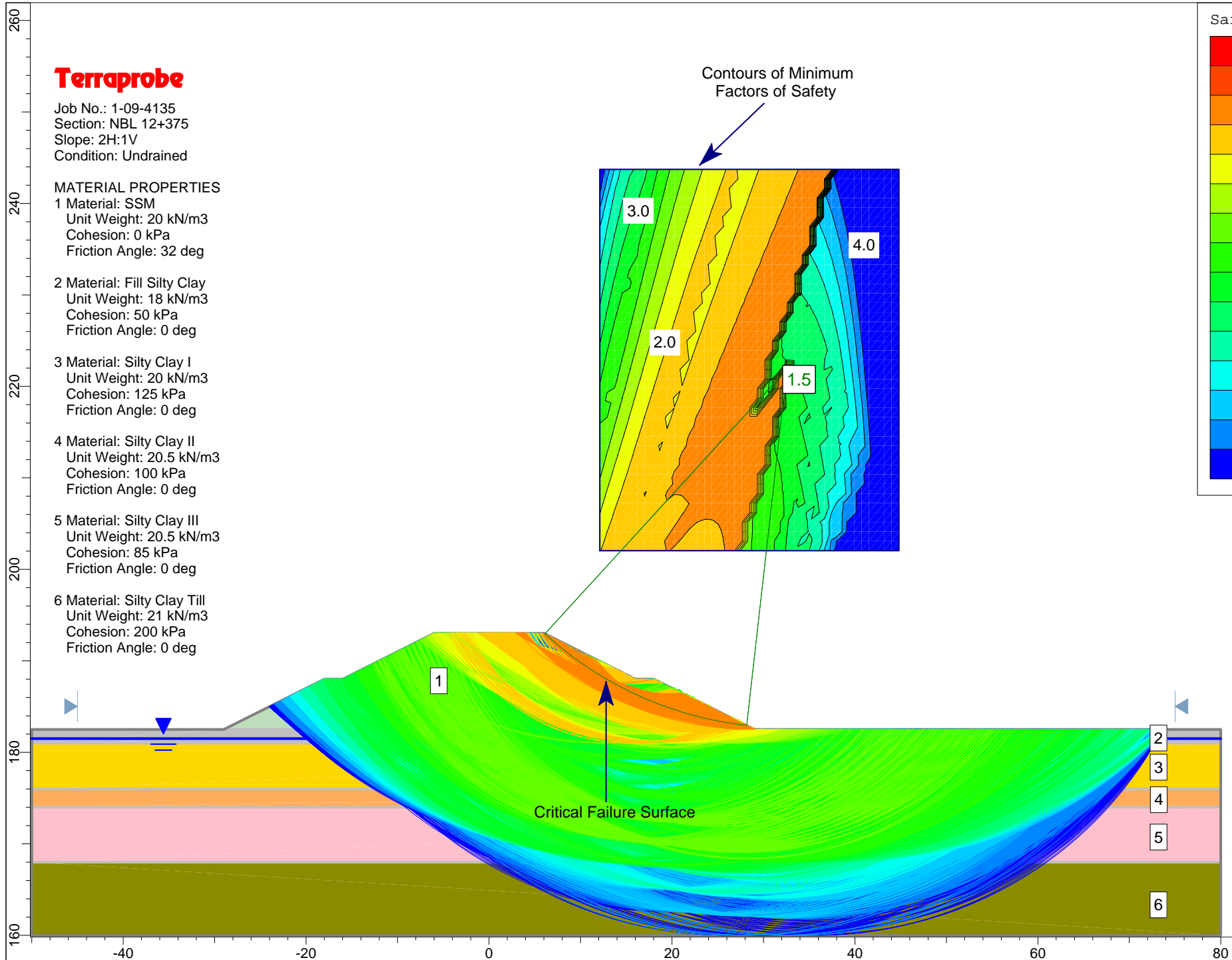
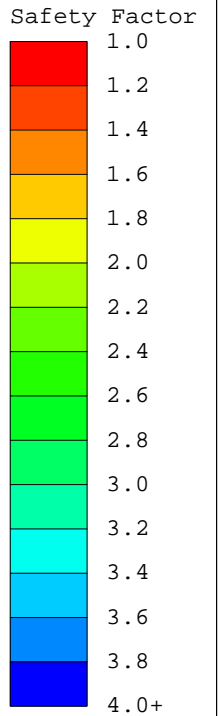
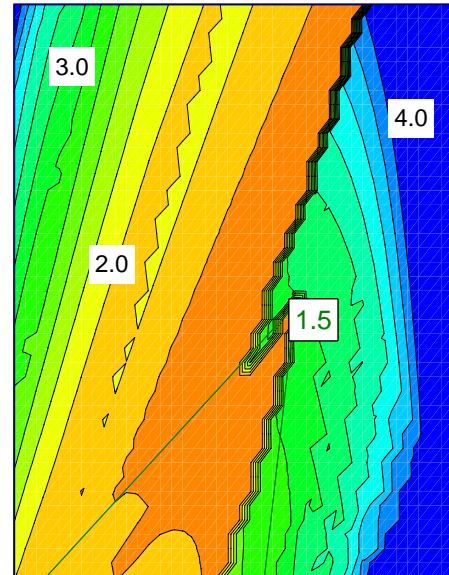
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+375
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

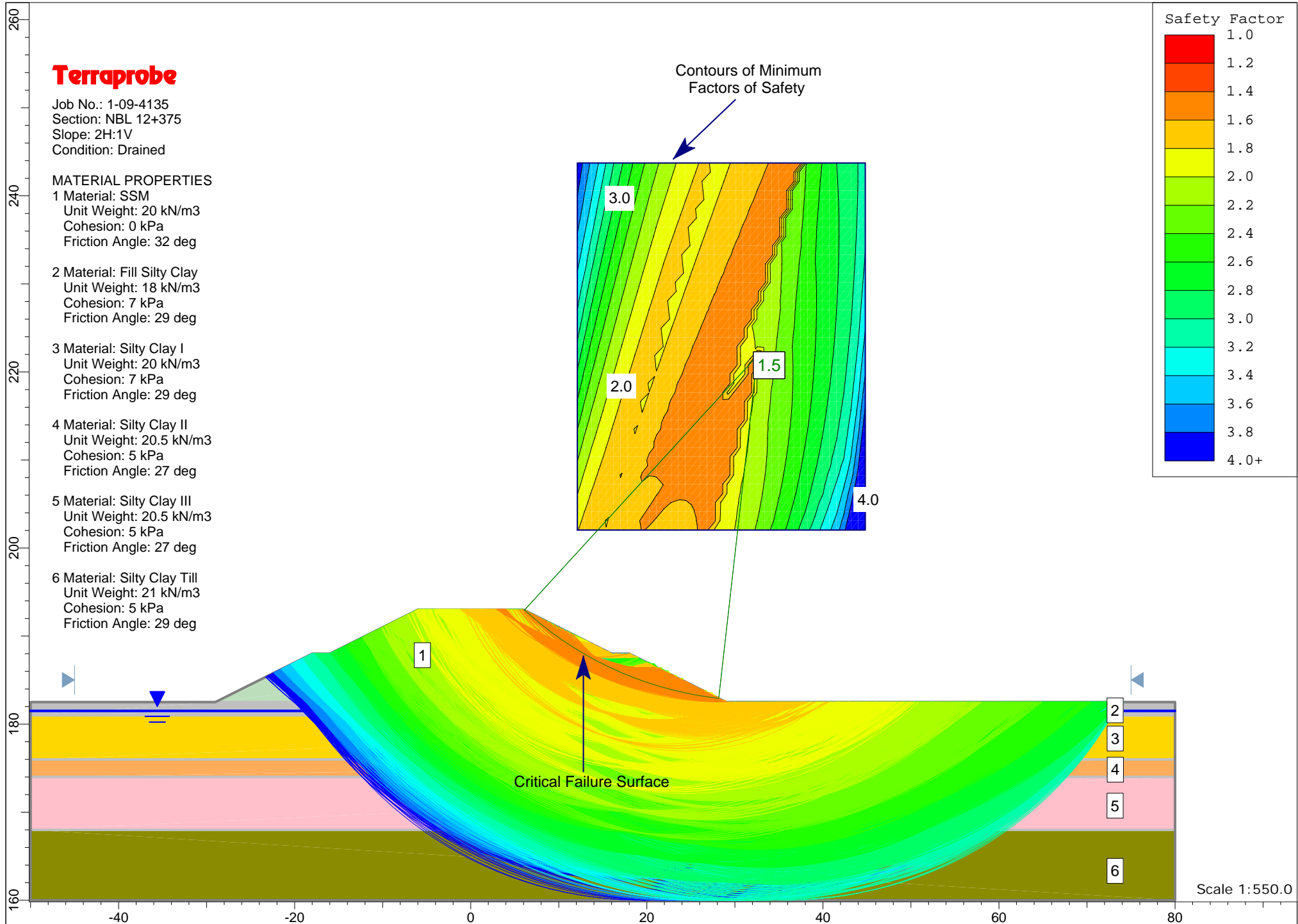
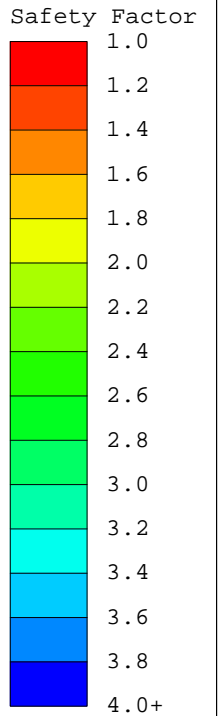
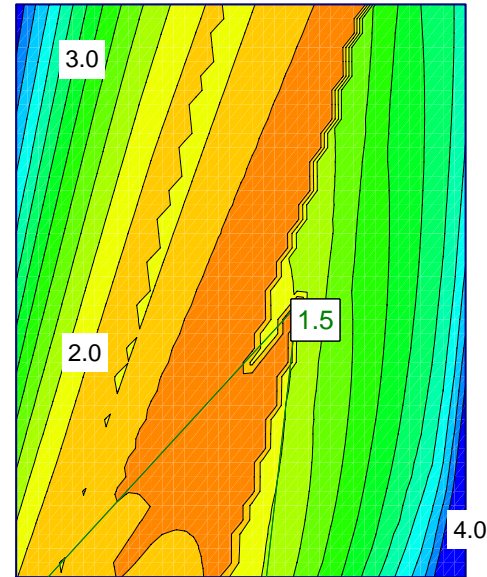
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+375
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety

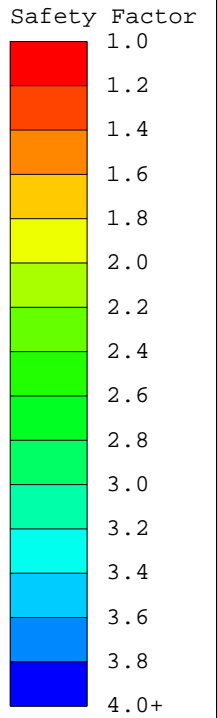


Terraprobe

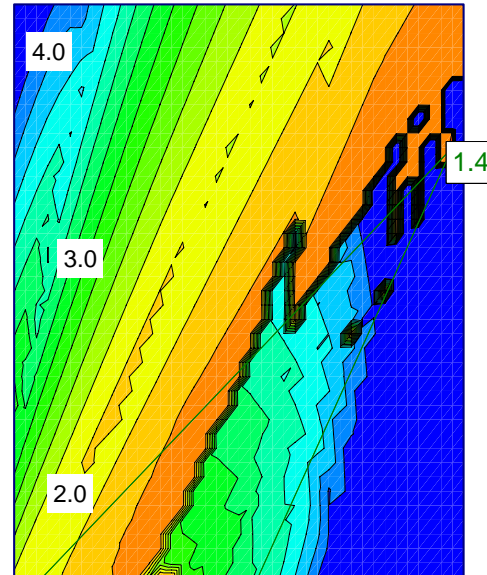
Job No.: 1-09-4135
Section: NBL 12+375
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

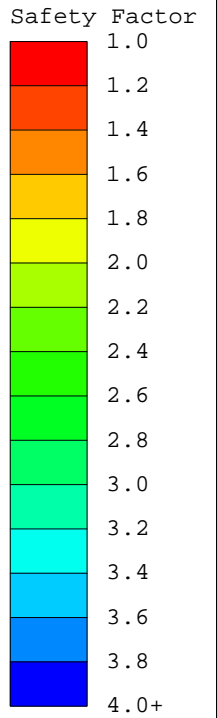
Scale 1:550.0

Terraprobe

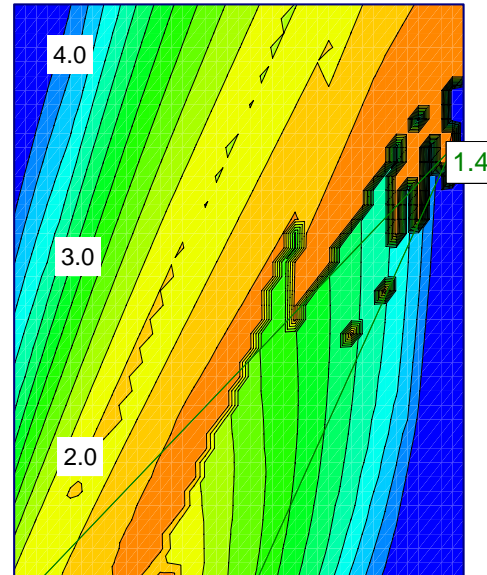
Job No.: 1-09-4135
Section: NBL 12+375
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+485
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

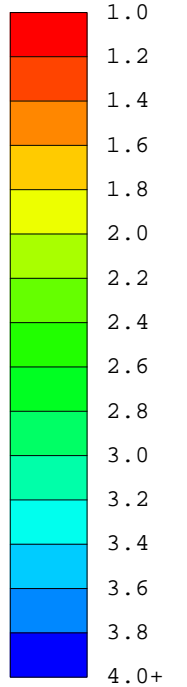
5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 90 kPa
Friction Angle: 0 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety

Critical Failure Surface

Safety Factor



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+485
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

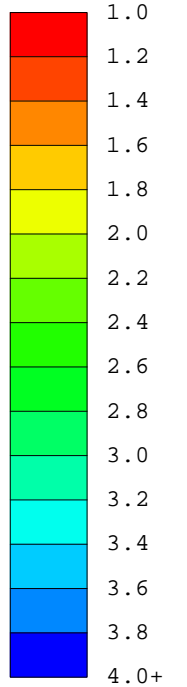
5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety

Critical Failure Surface

Safety Factor



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+485
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 90 kPa
Friction Angle: 0 deg

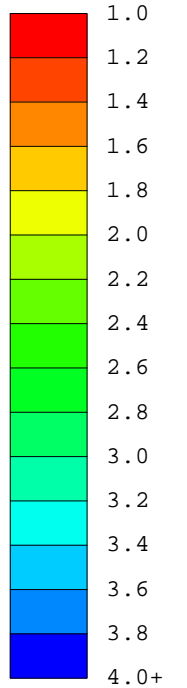
6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Critical Failure Surface

Safety Factor



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+485
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

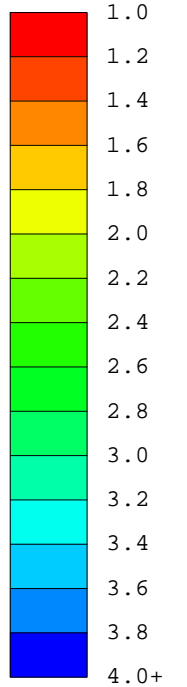
6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Critical Failure Surface

Safety Factor



Scale 1:550.0

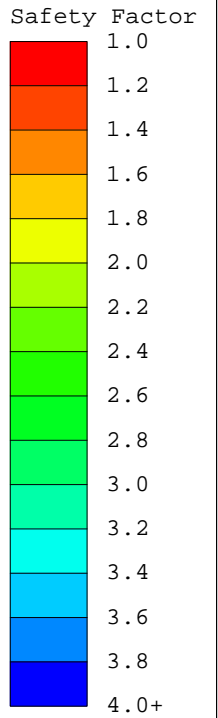
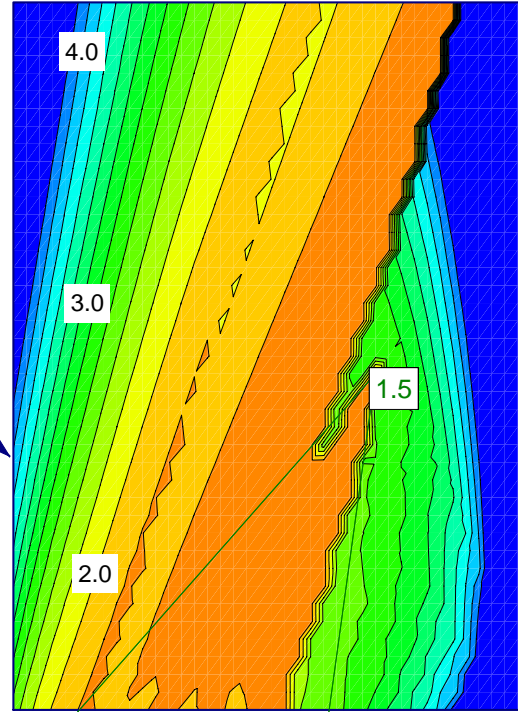
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+485
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 90 kPa
Friction Angle: 0 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

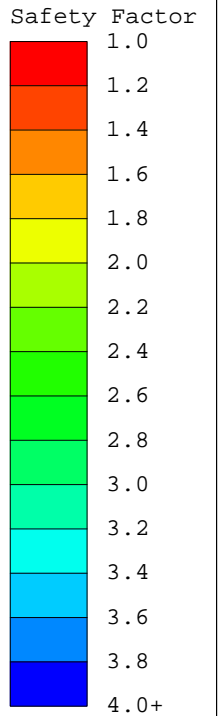
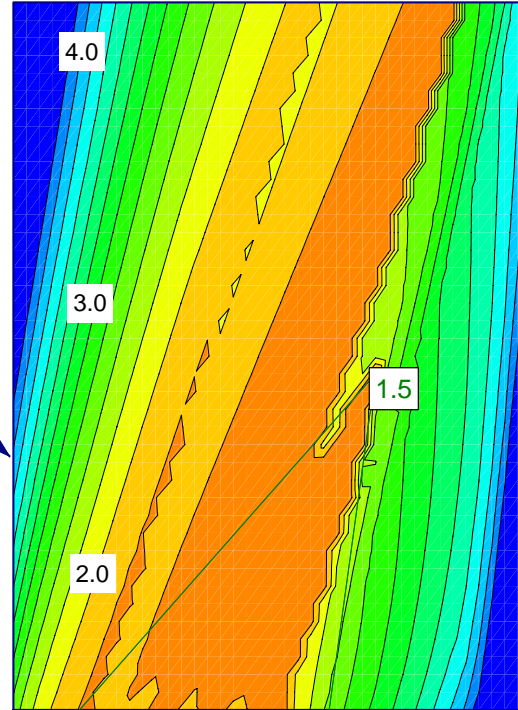
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+485
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+485
Slope: 1.25H:1V
Condition: Undrained

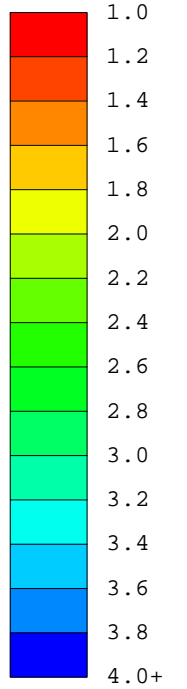
MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 90 kPa
Friction Angle: 0 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety

Critical Failure Surface

Safety Factor



Scale 1:550.0

Terraprobe

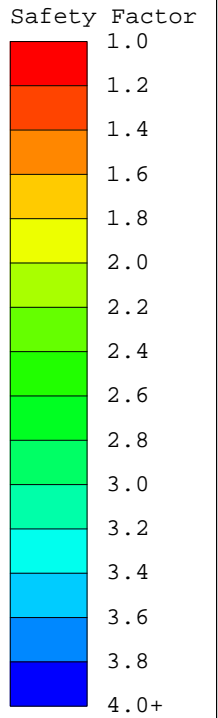
Job No.: 1-09-4135
Section: SBL 12+485
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety

Critical Failure Surface



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+525
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

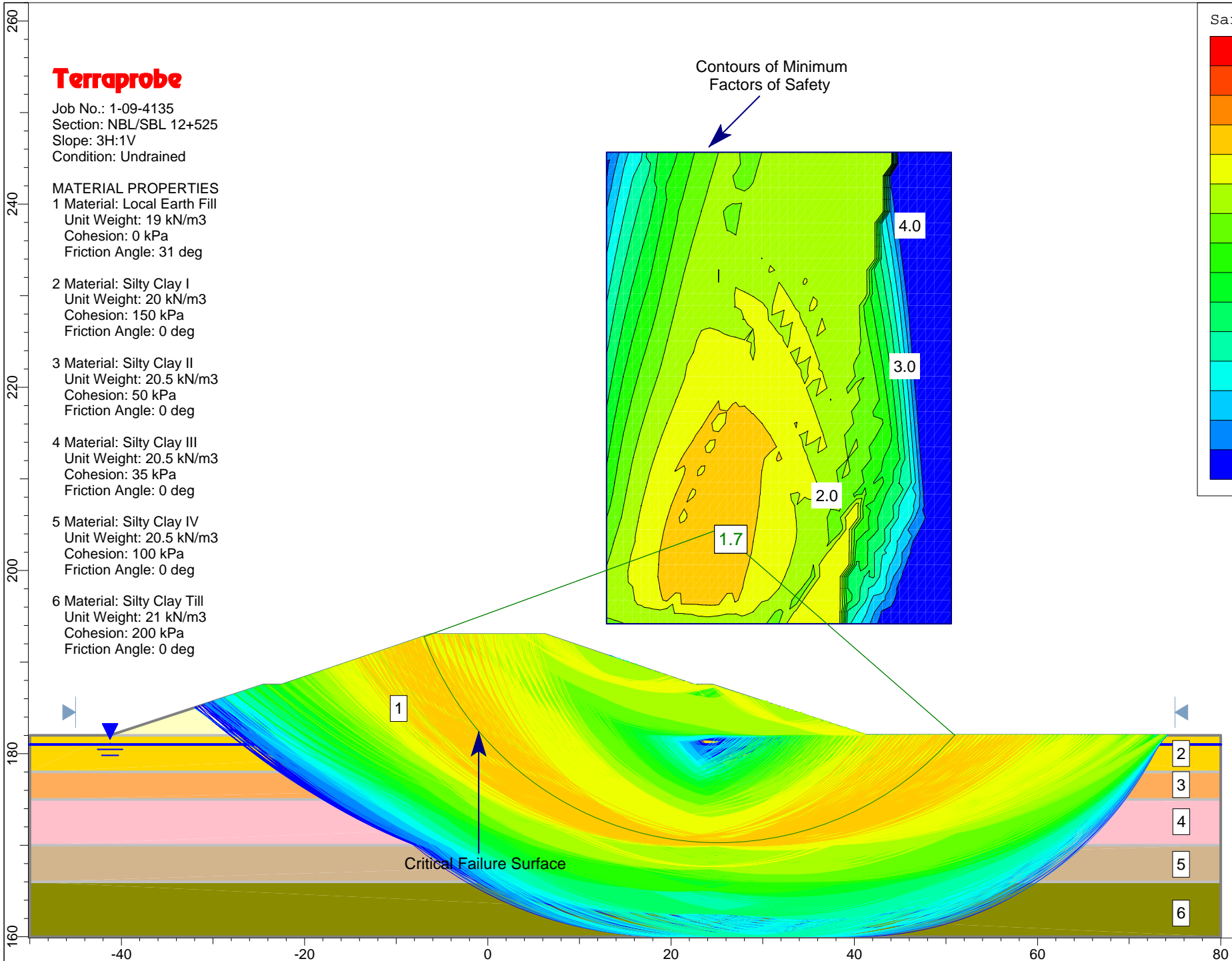
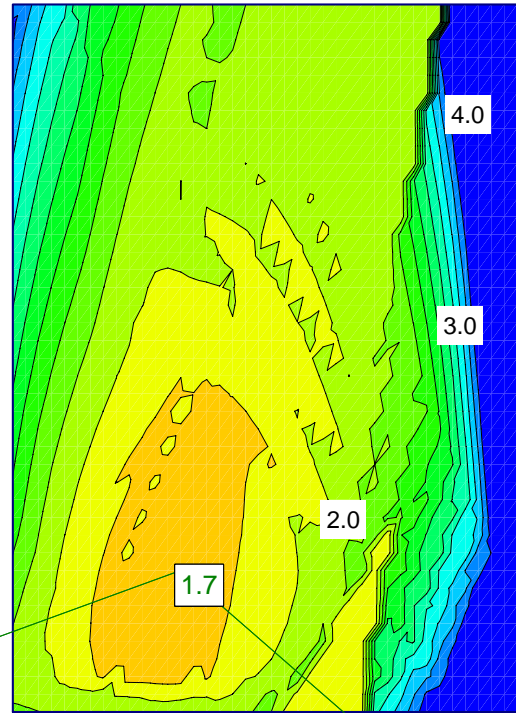
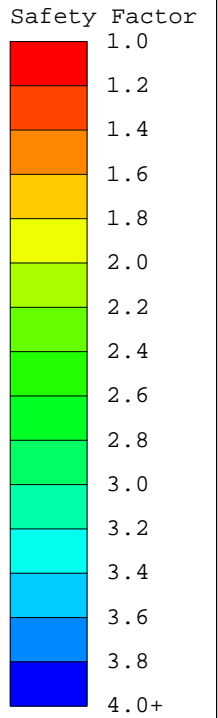
3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 35 kPa
Friction Angle: 0 deg

5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety

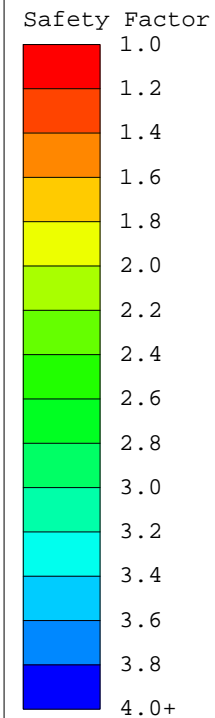


Terraprobe

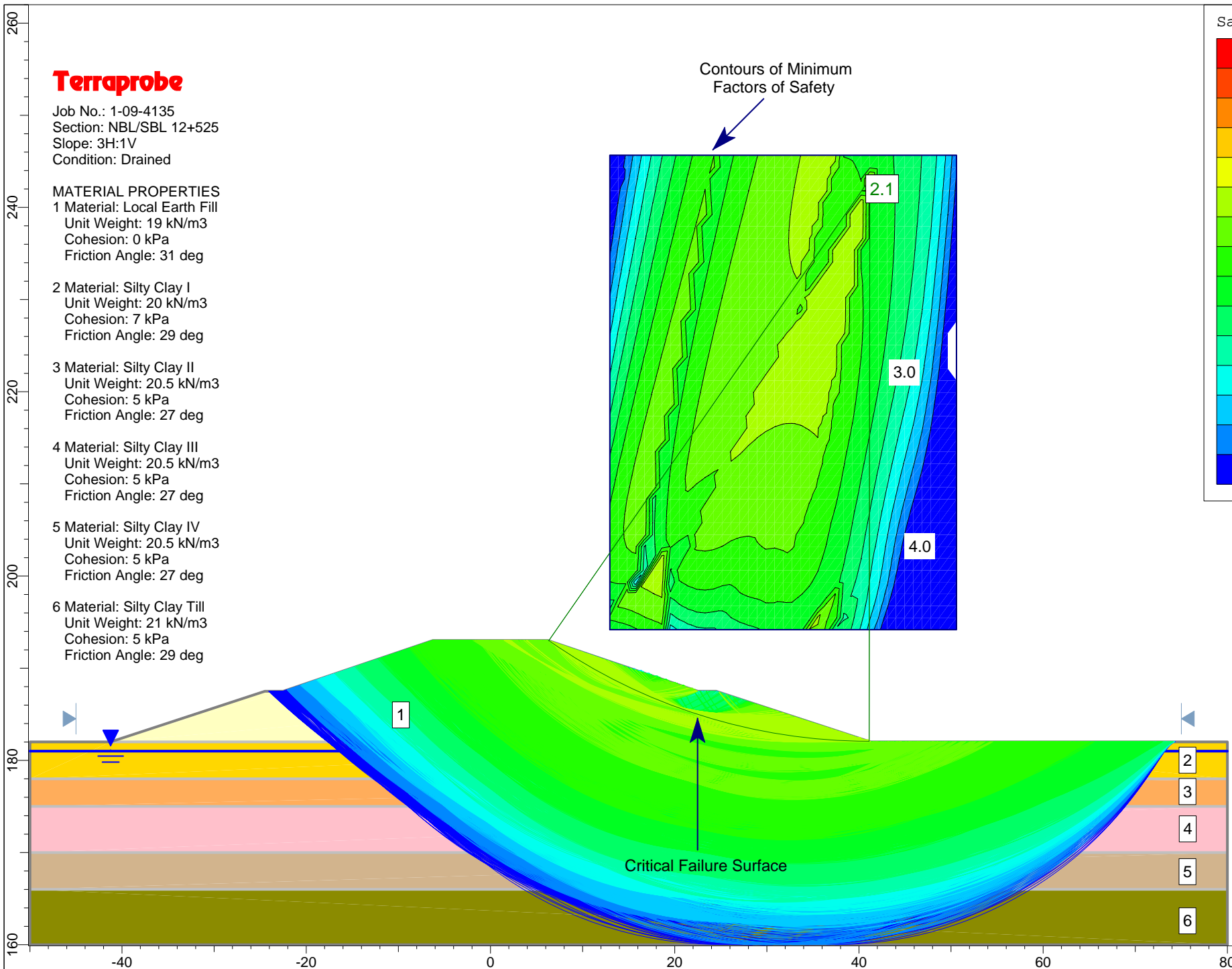
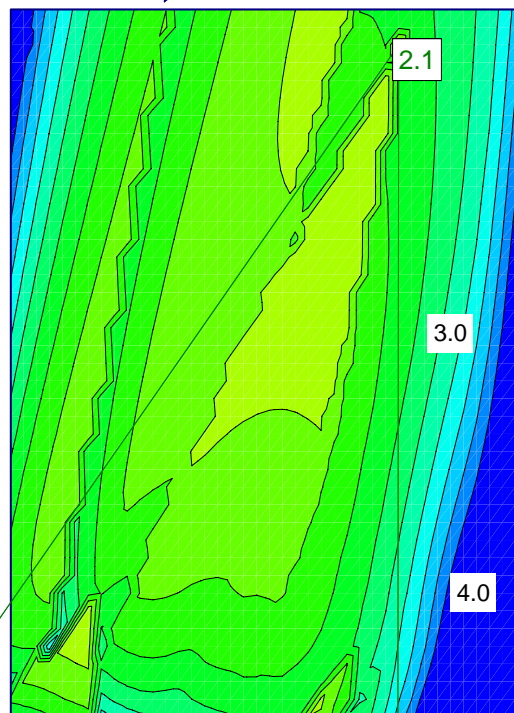
Job No.: 1-09-4135
Section: NBL/SBL 12+525
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg



Contours of Minimum
Factors of Safety



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+525
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 35 kPa
Friction Angle: 0 deg

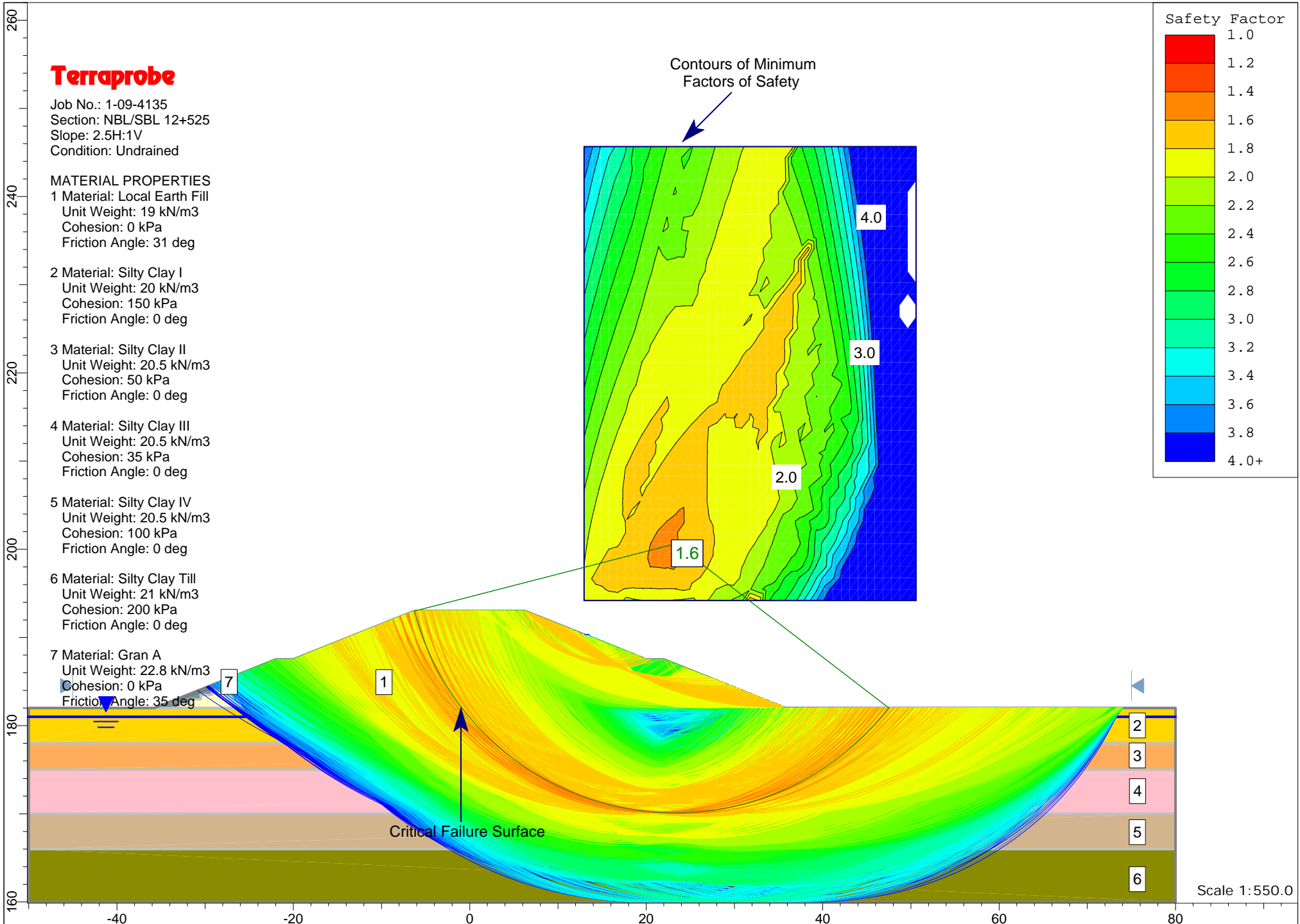
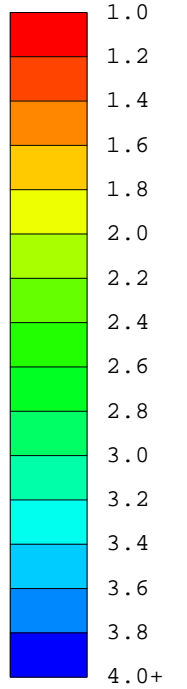
5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+525
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

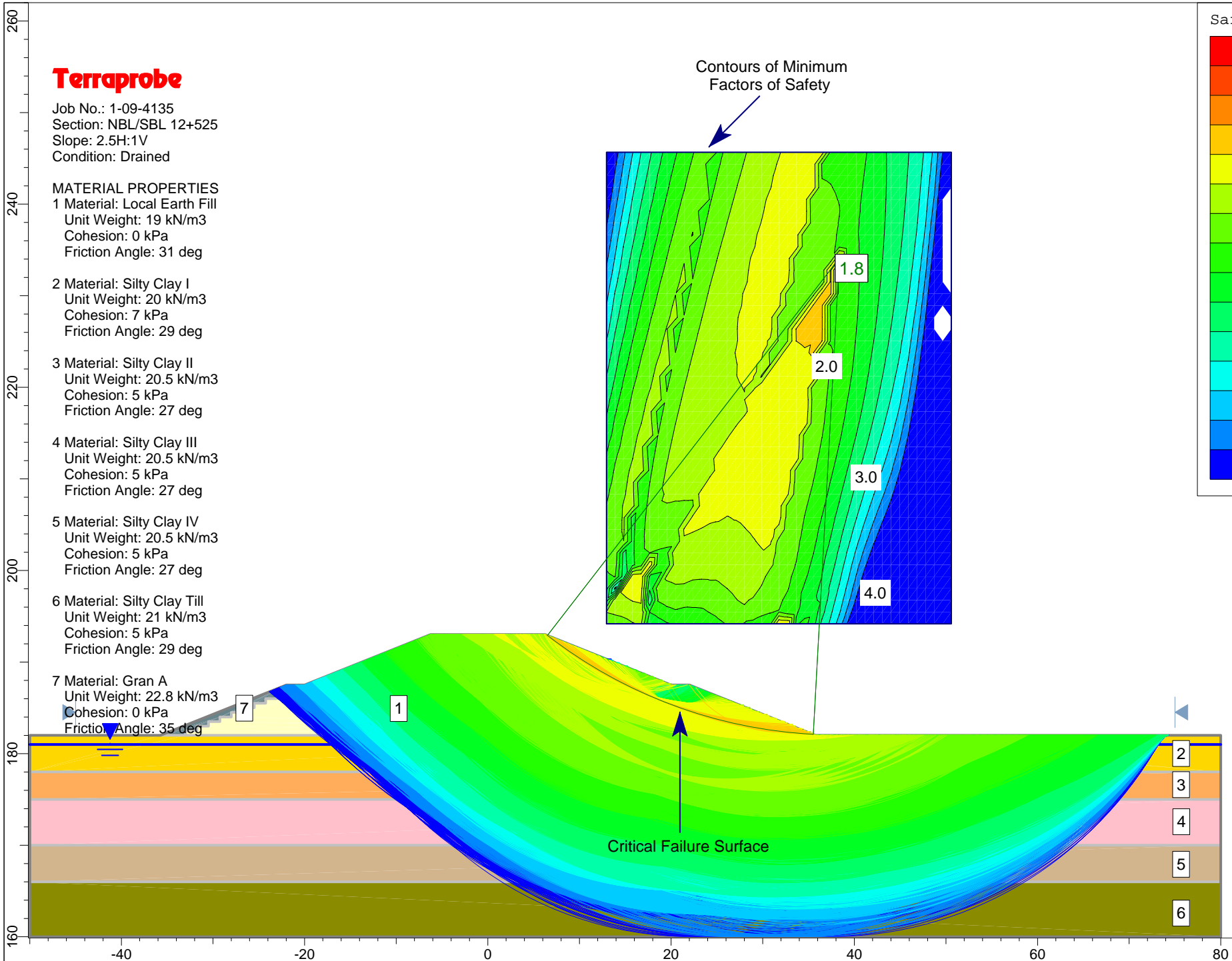
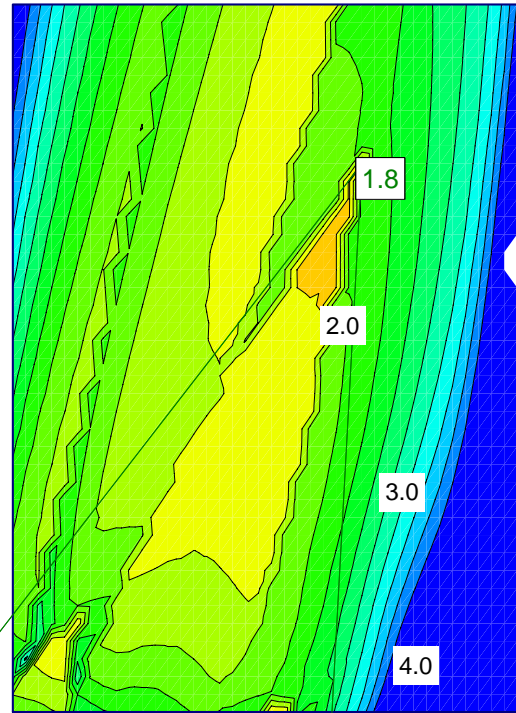
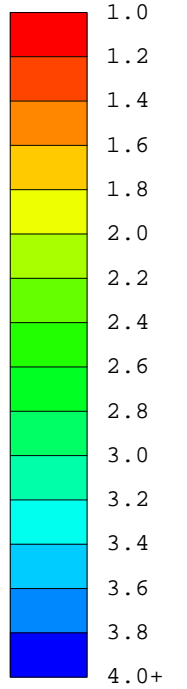
5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



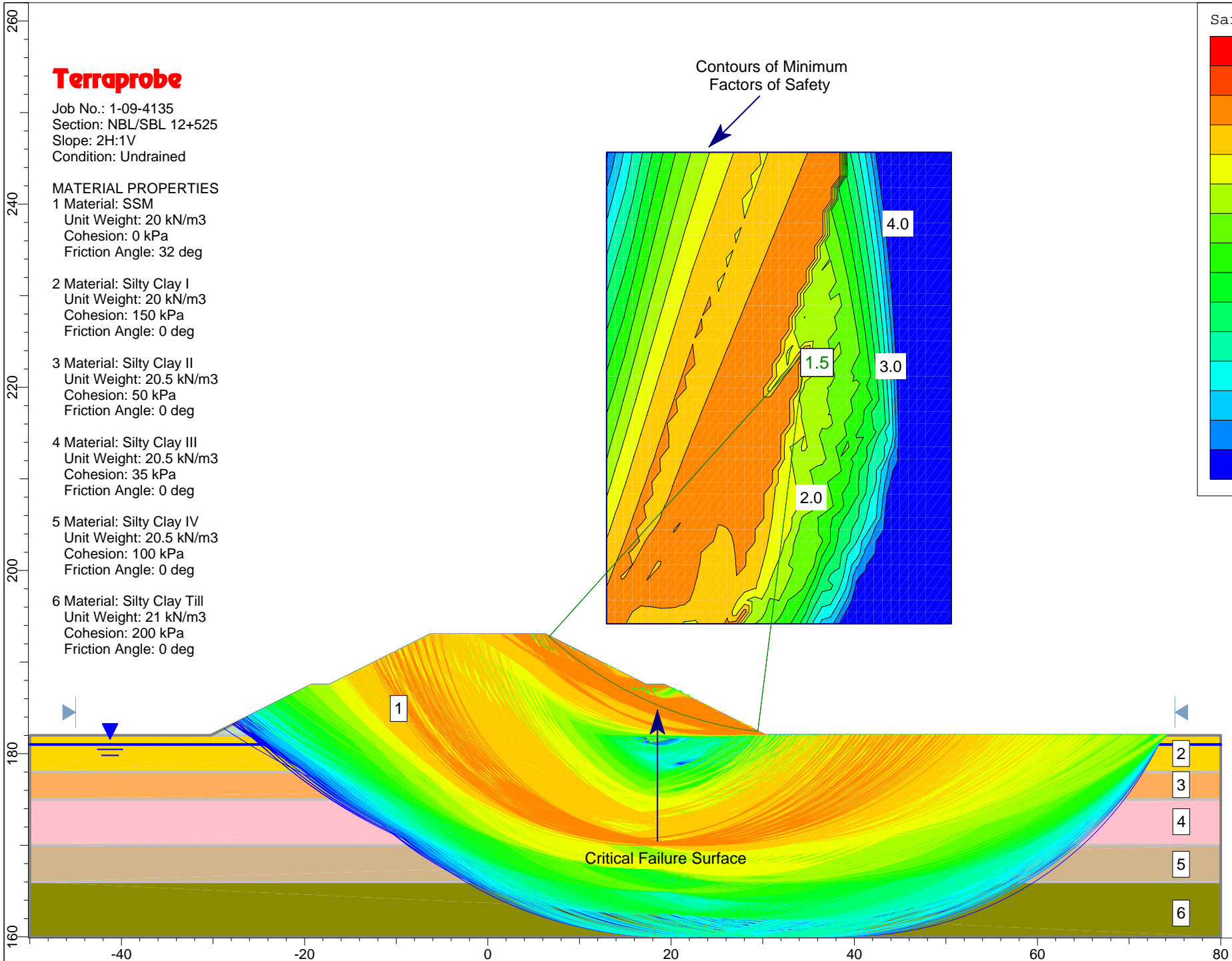
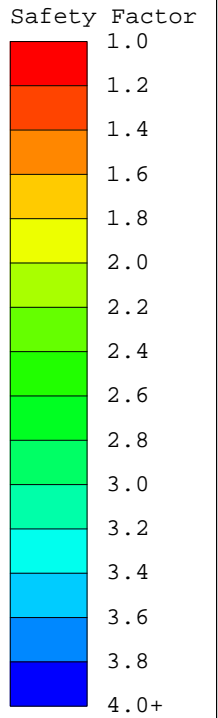
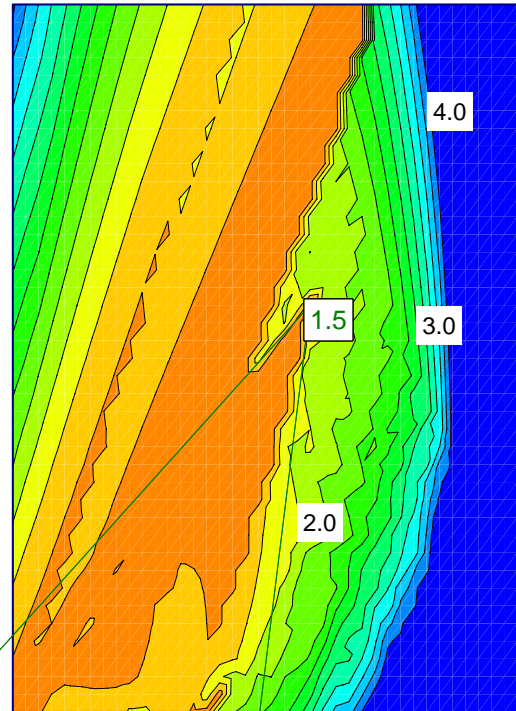
Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+525
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 35 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

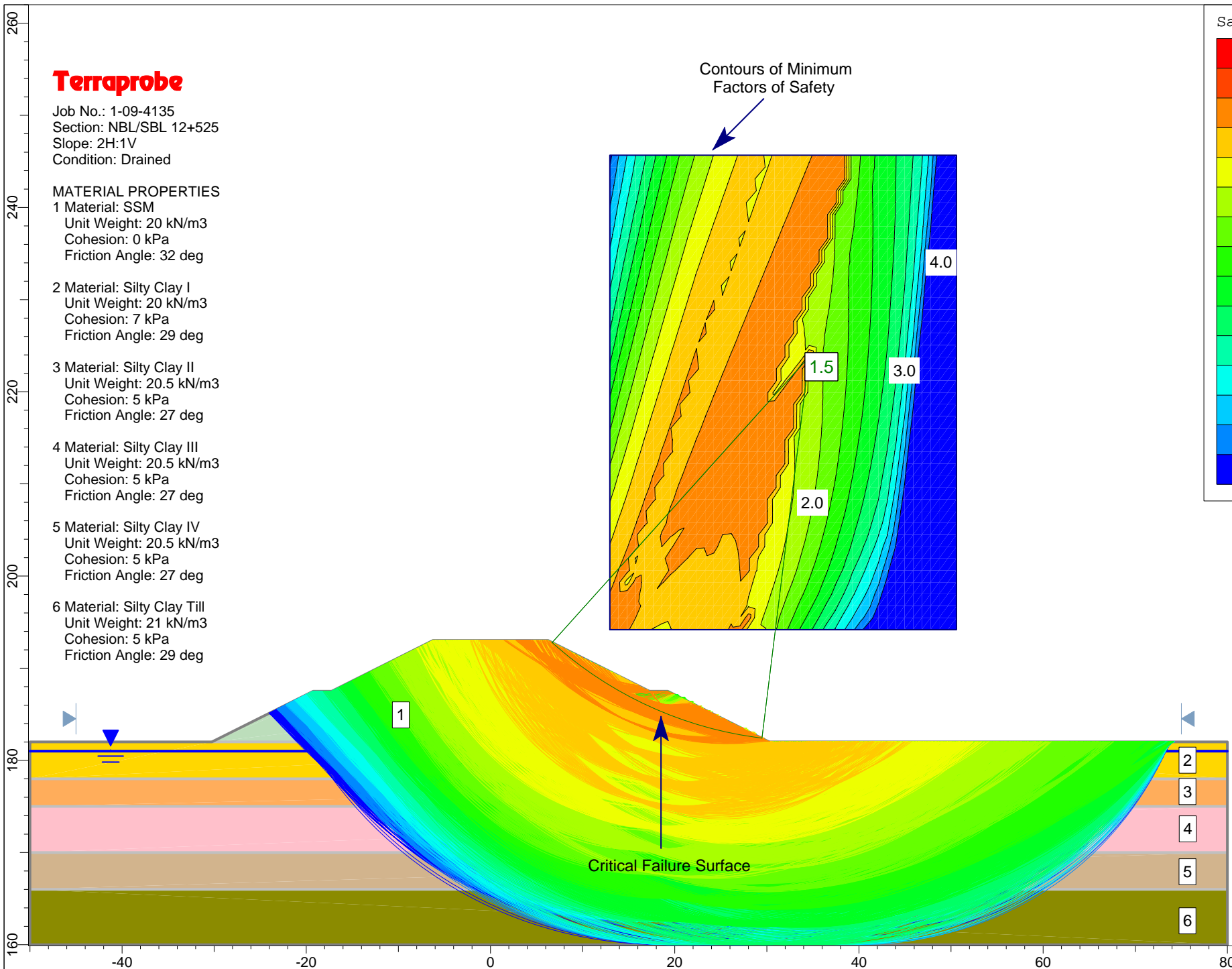
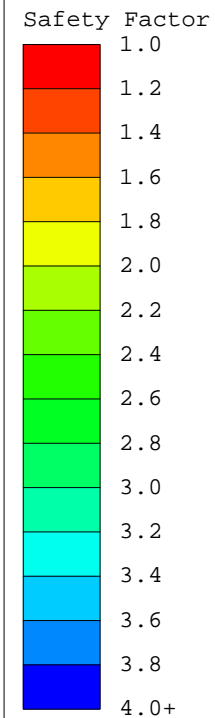
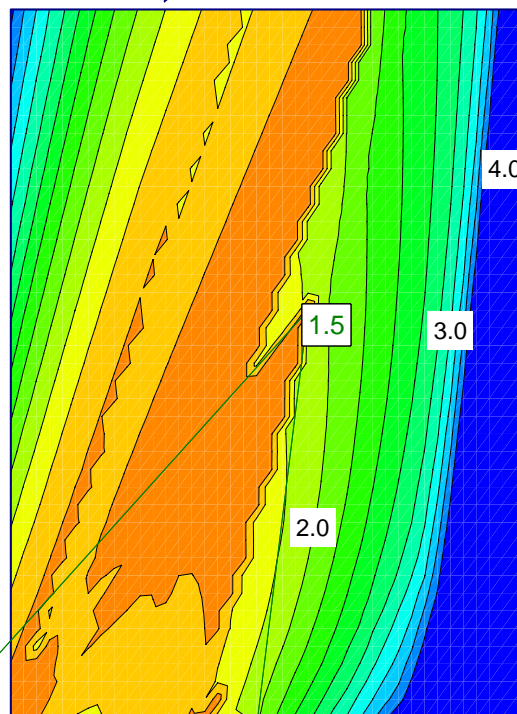
Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+525
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety



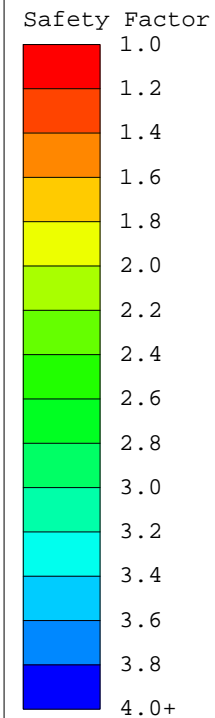
Scale 1:550.0

Terraprobe

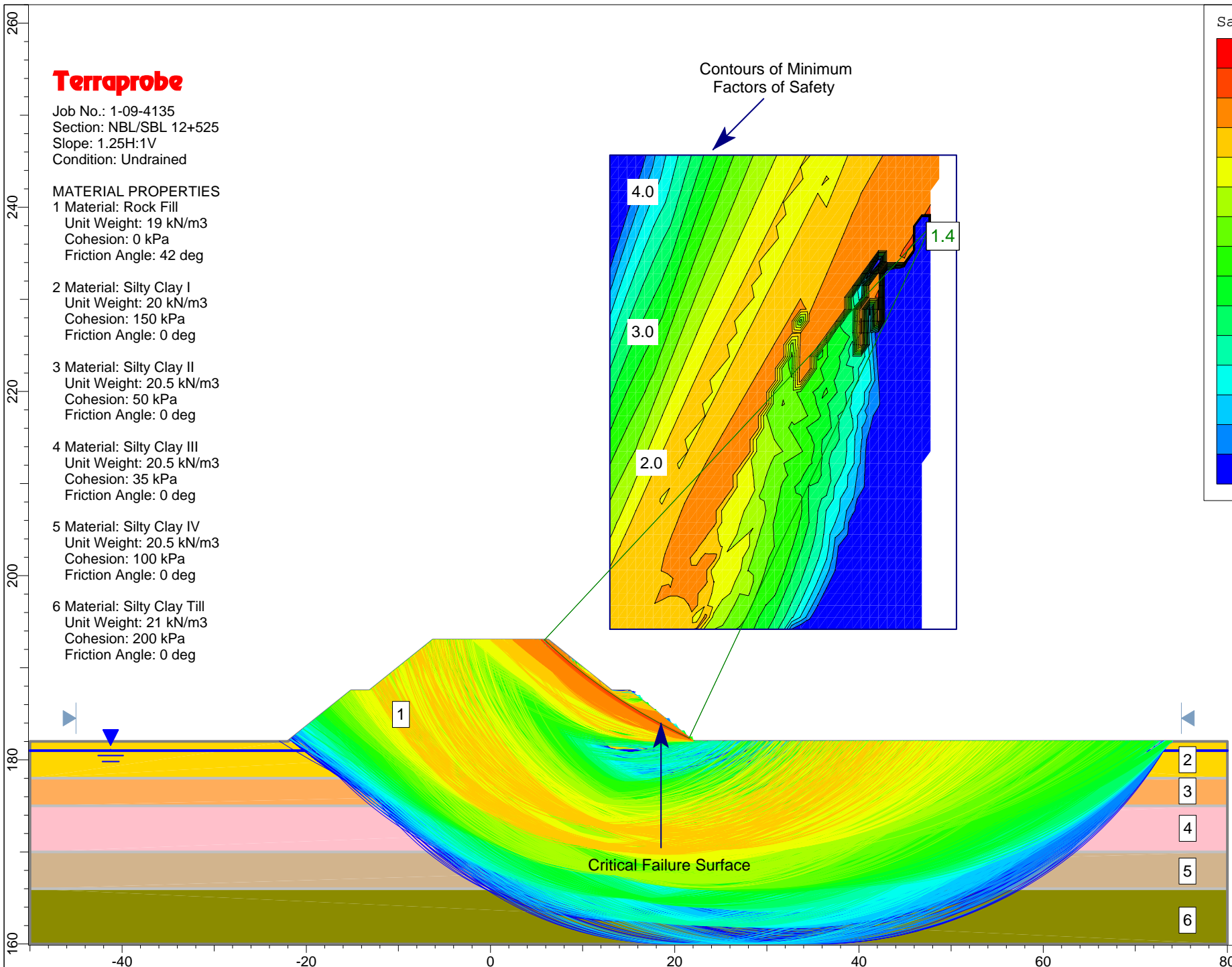
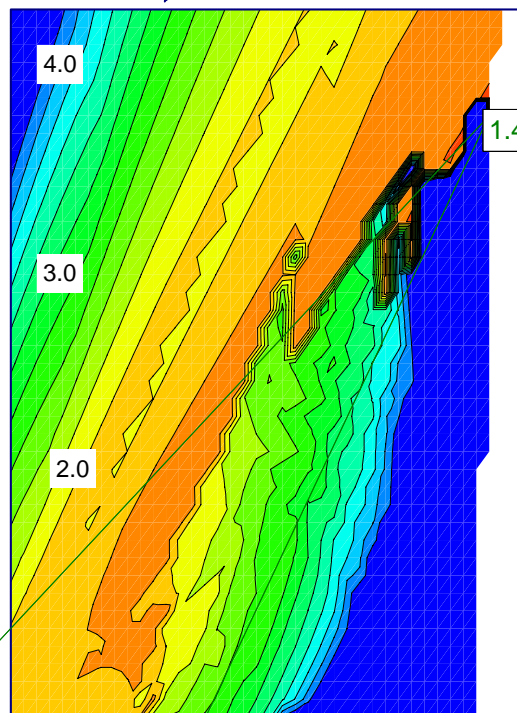
Job No.: 1-09-4135
Section: NBL/SBL 12+525
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 35 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg



Contours of Minimum Factors of Safety



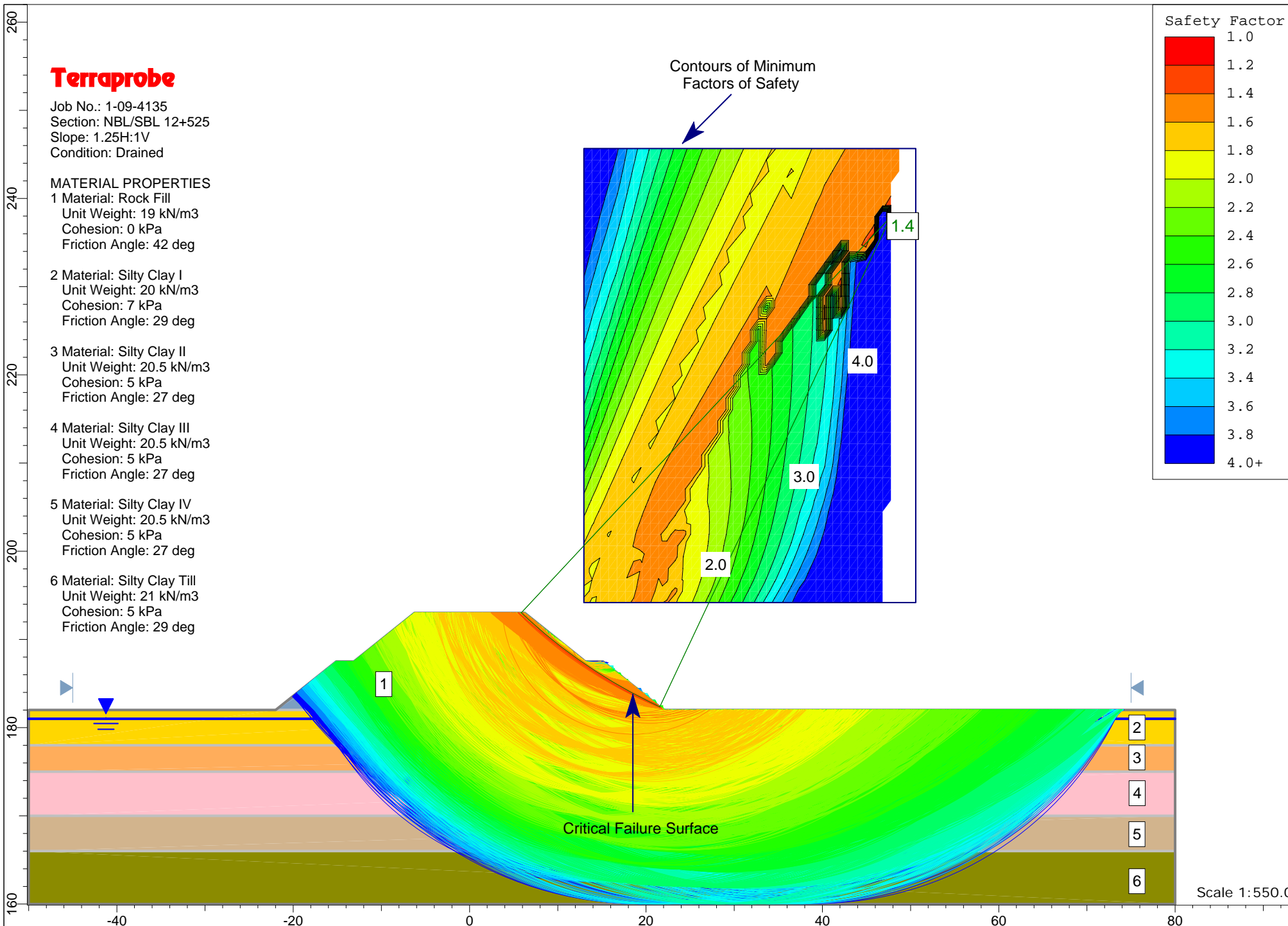
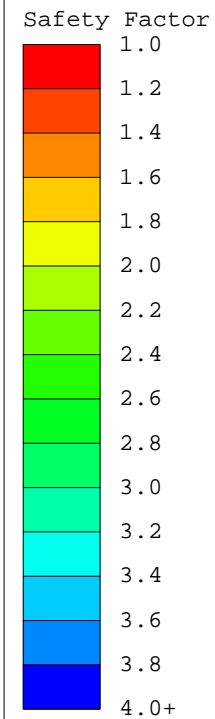
Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+525
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay IV
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 6 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

Contours of Minimum
Factors of Safety



Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+600
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 110 kPa
Friction Angle: 0 deg

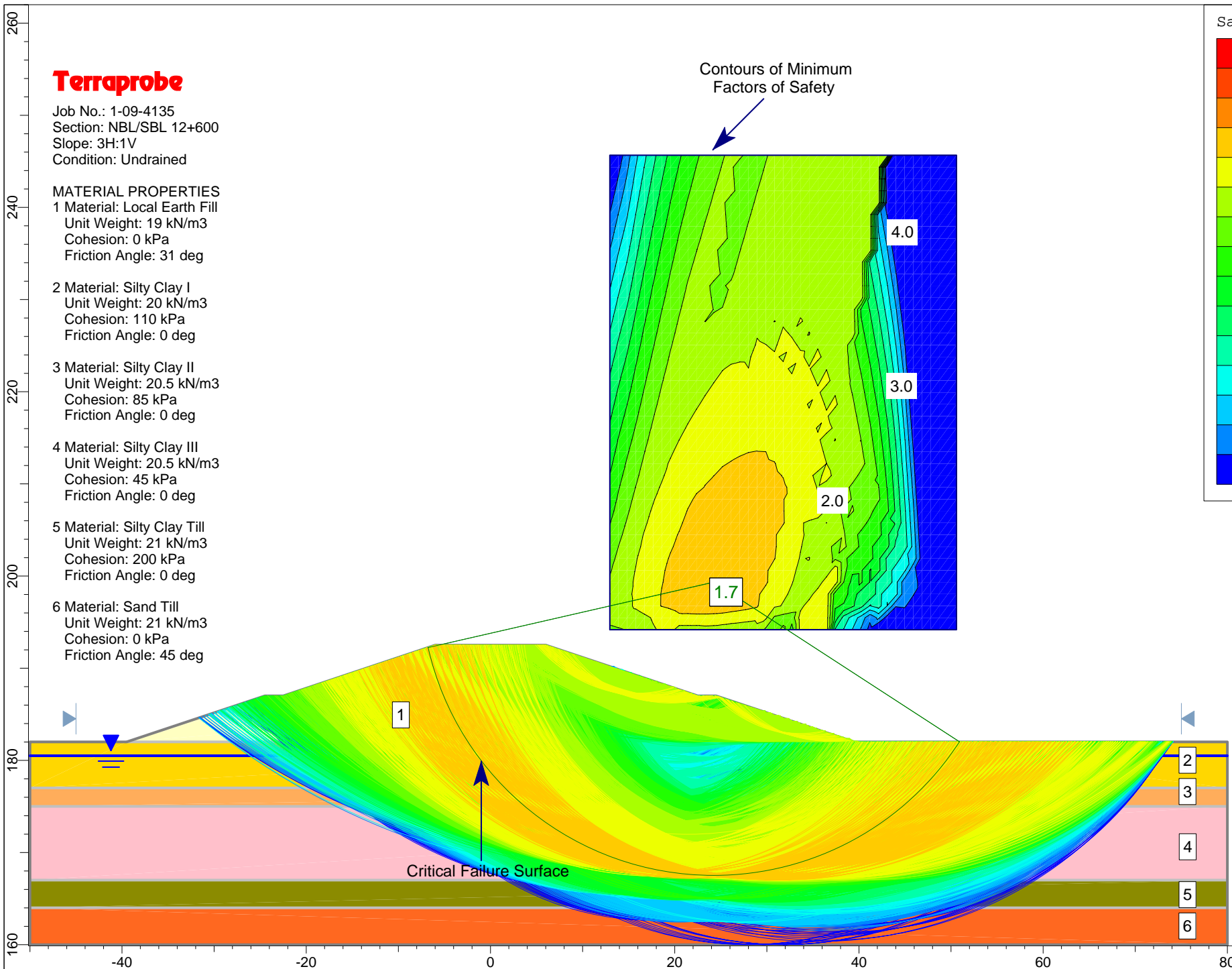
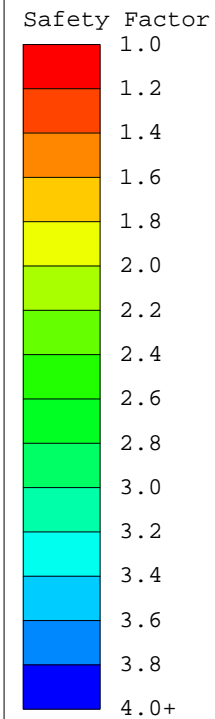
3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 45 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+600
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

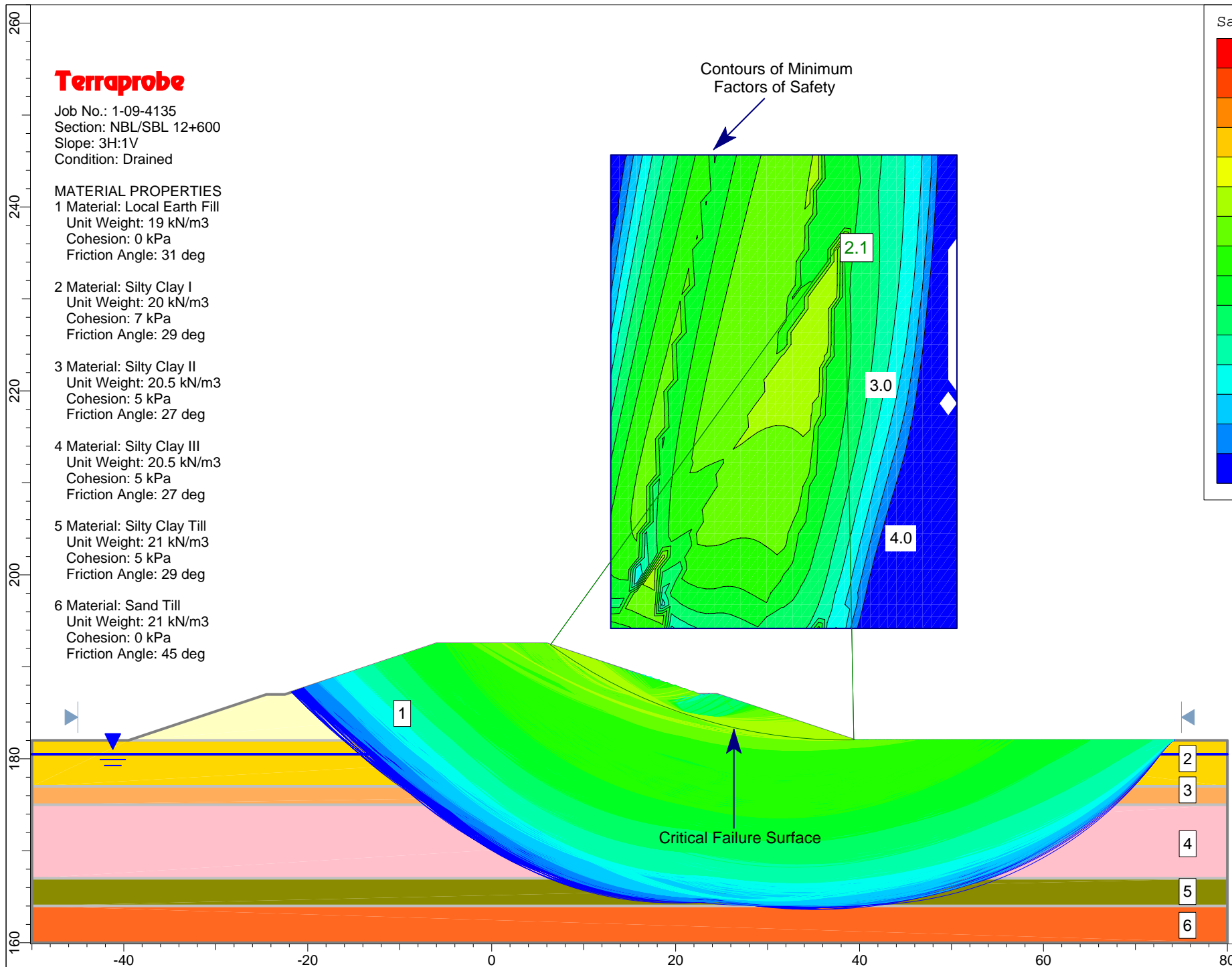
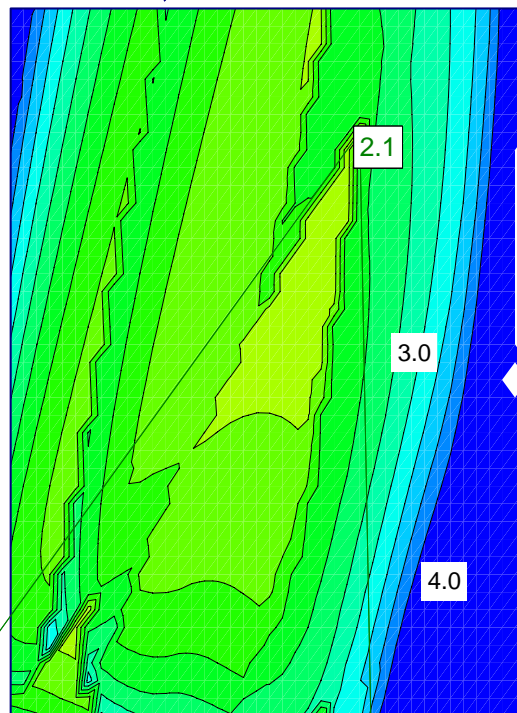
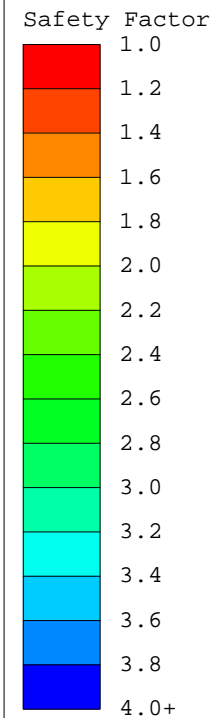
3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+600
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 110 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg

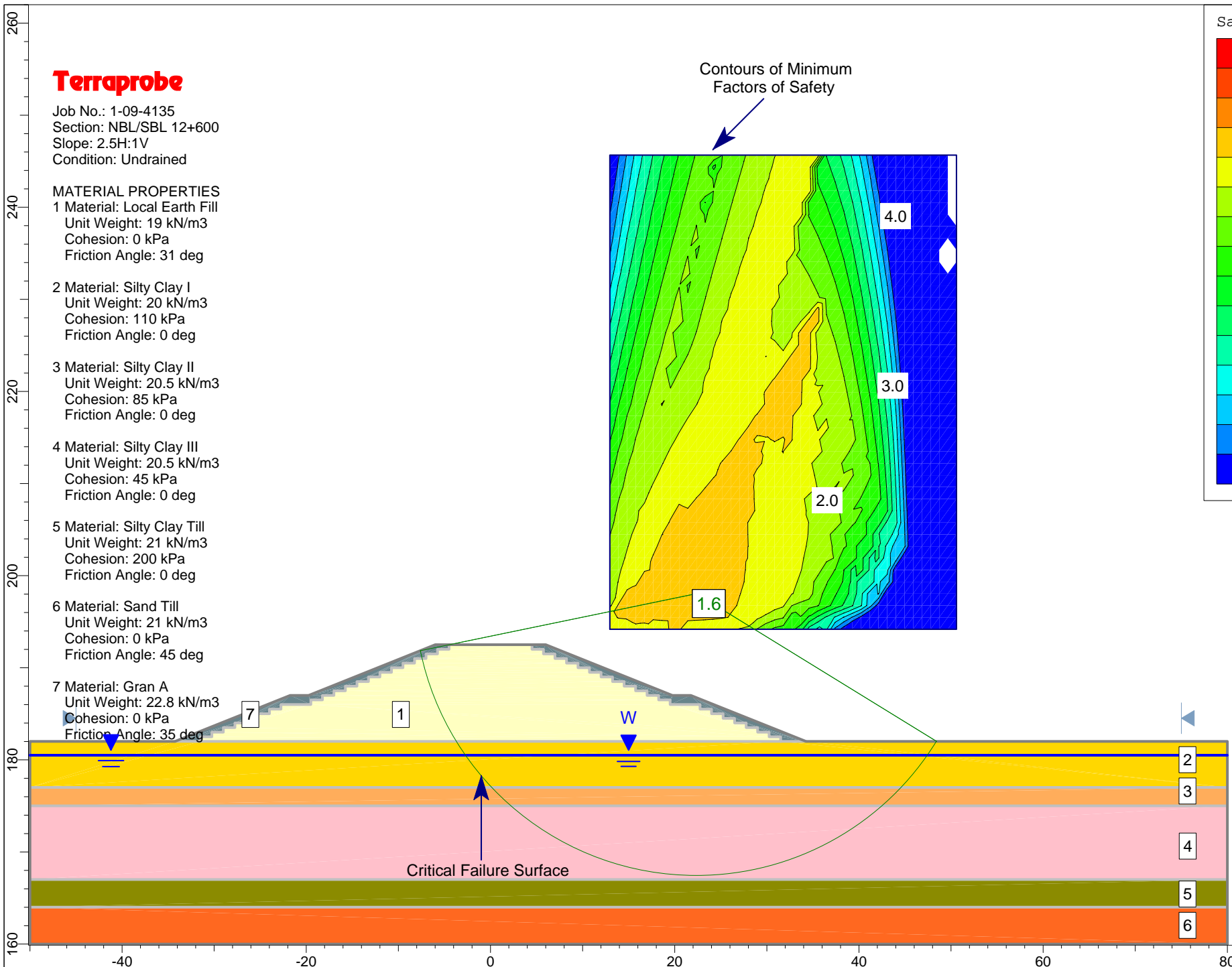
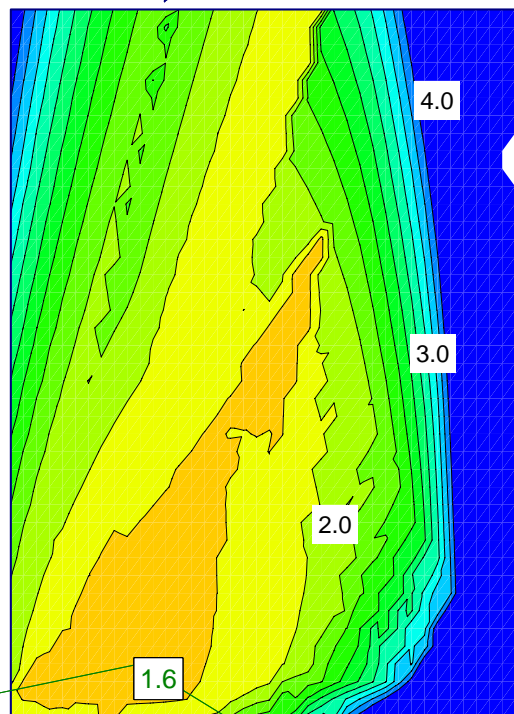
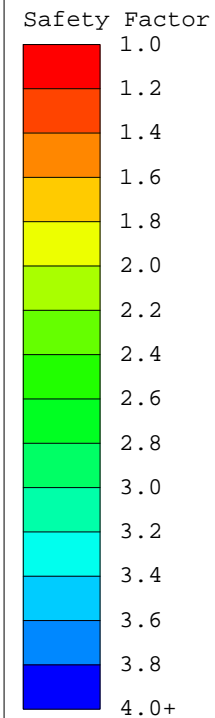
4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 45 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+600
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

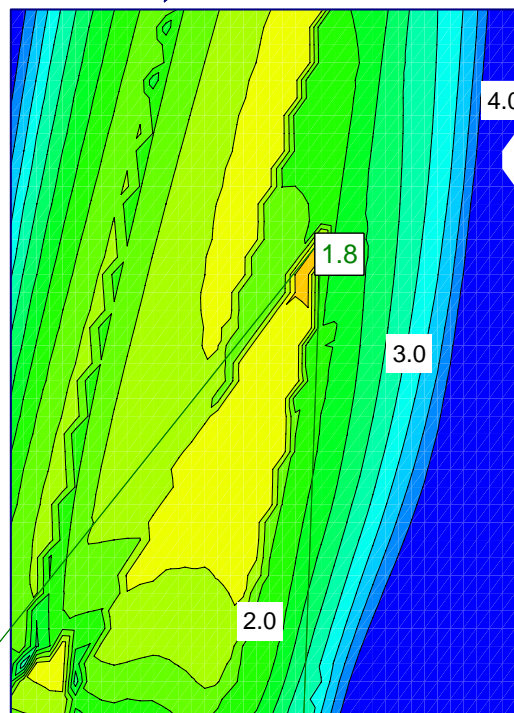
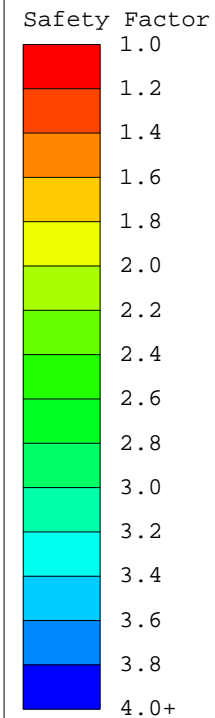
4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

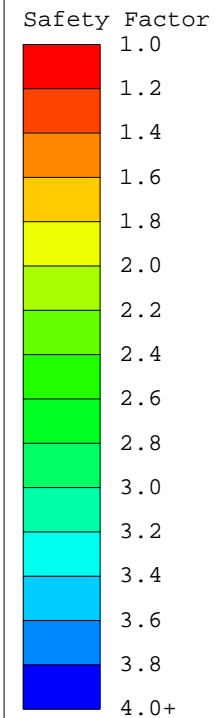
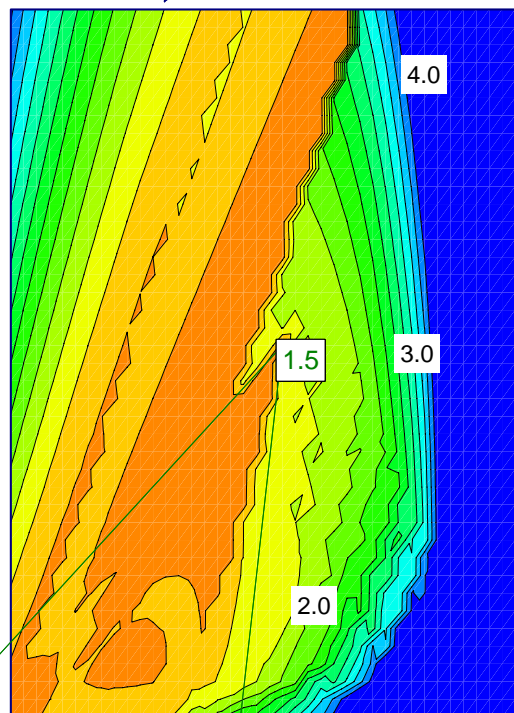
Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+600
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 110 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 45 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

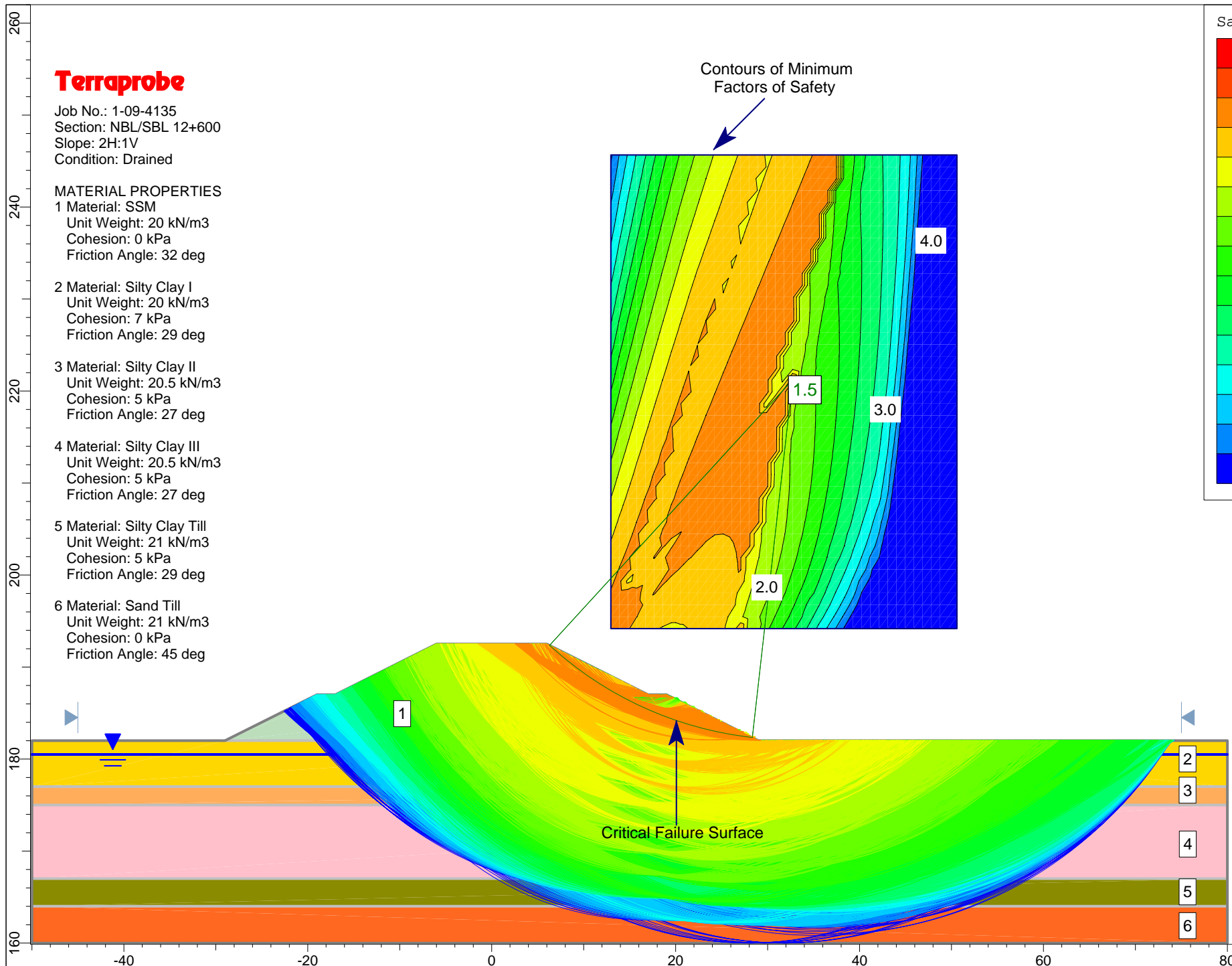
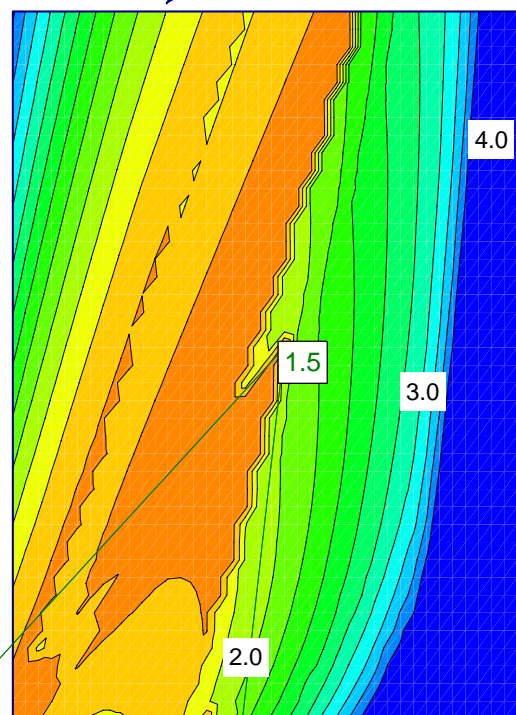
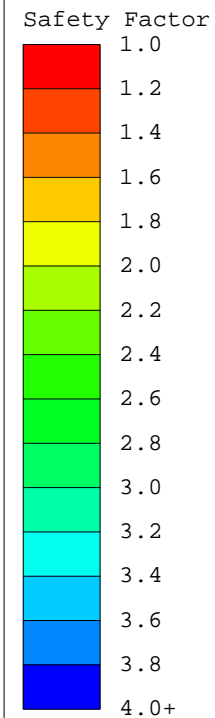
Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+600
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



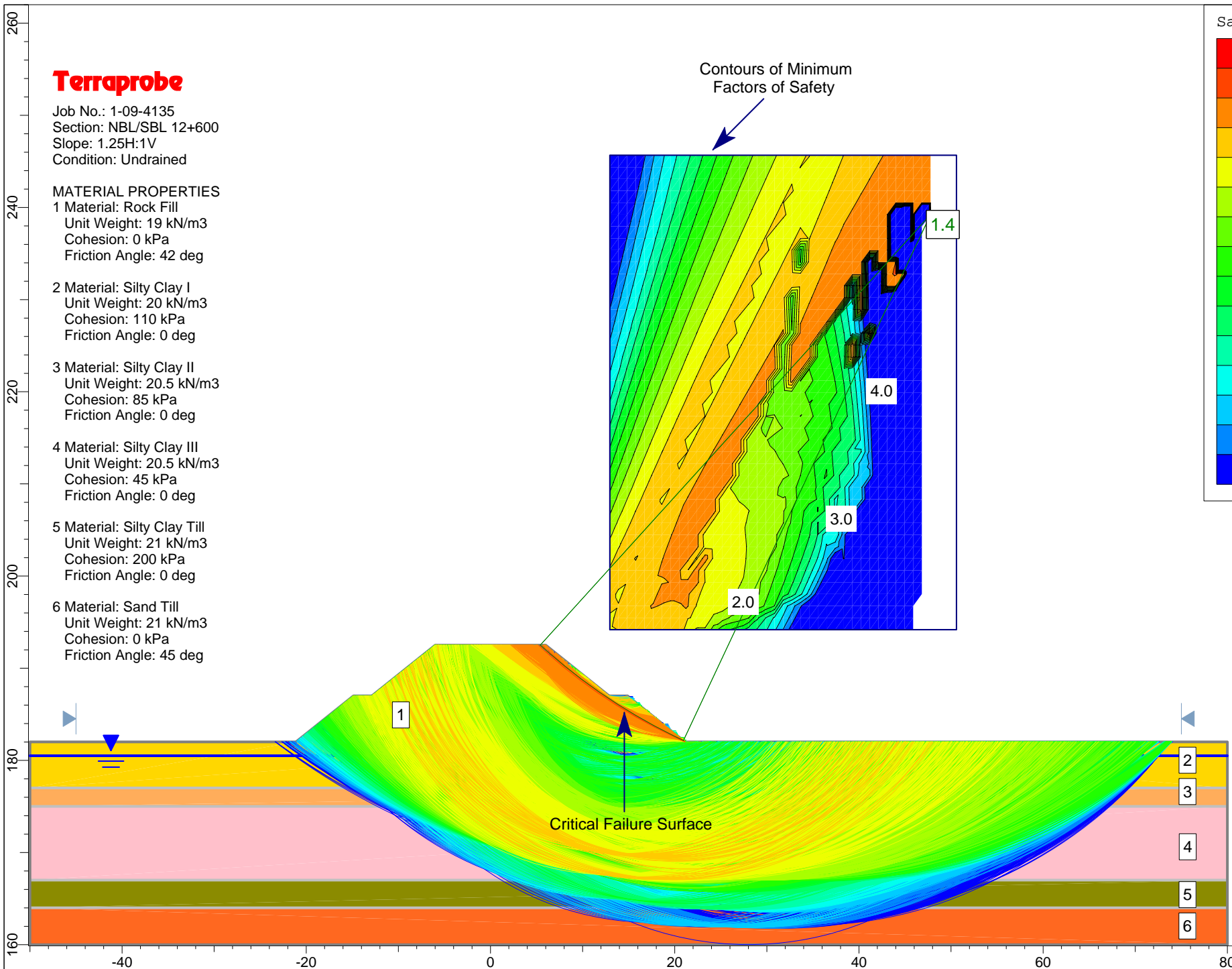
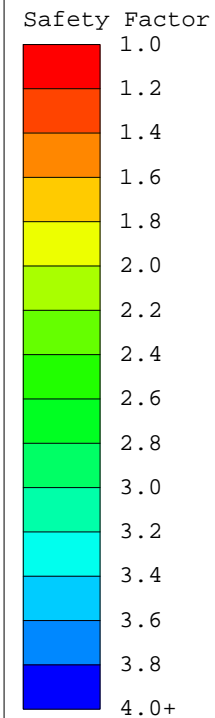
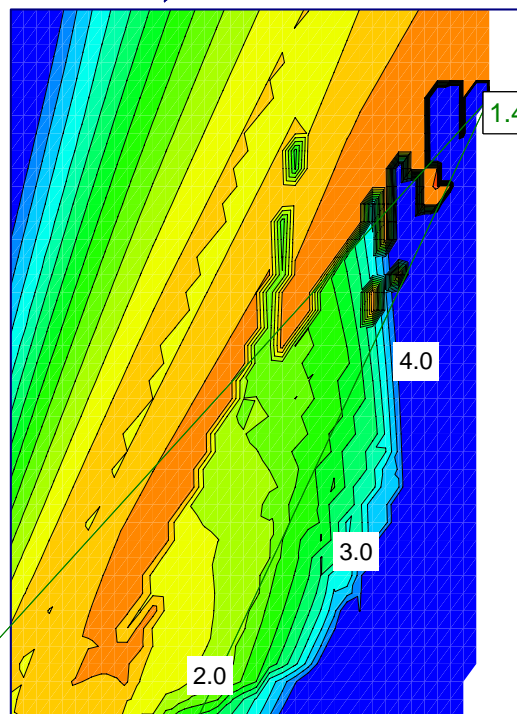
Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+600
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 110 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 85 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 45 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

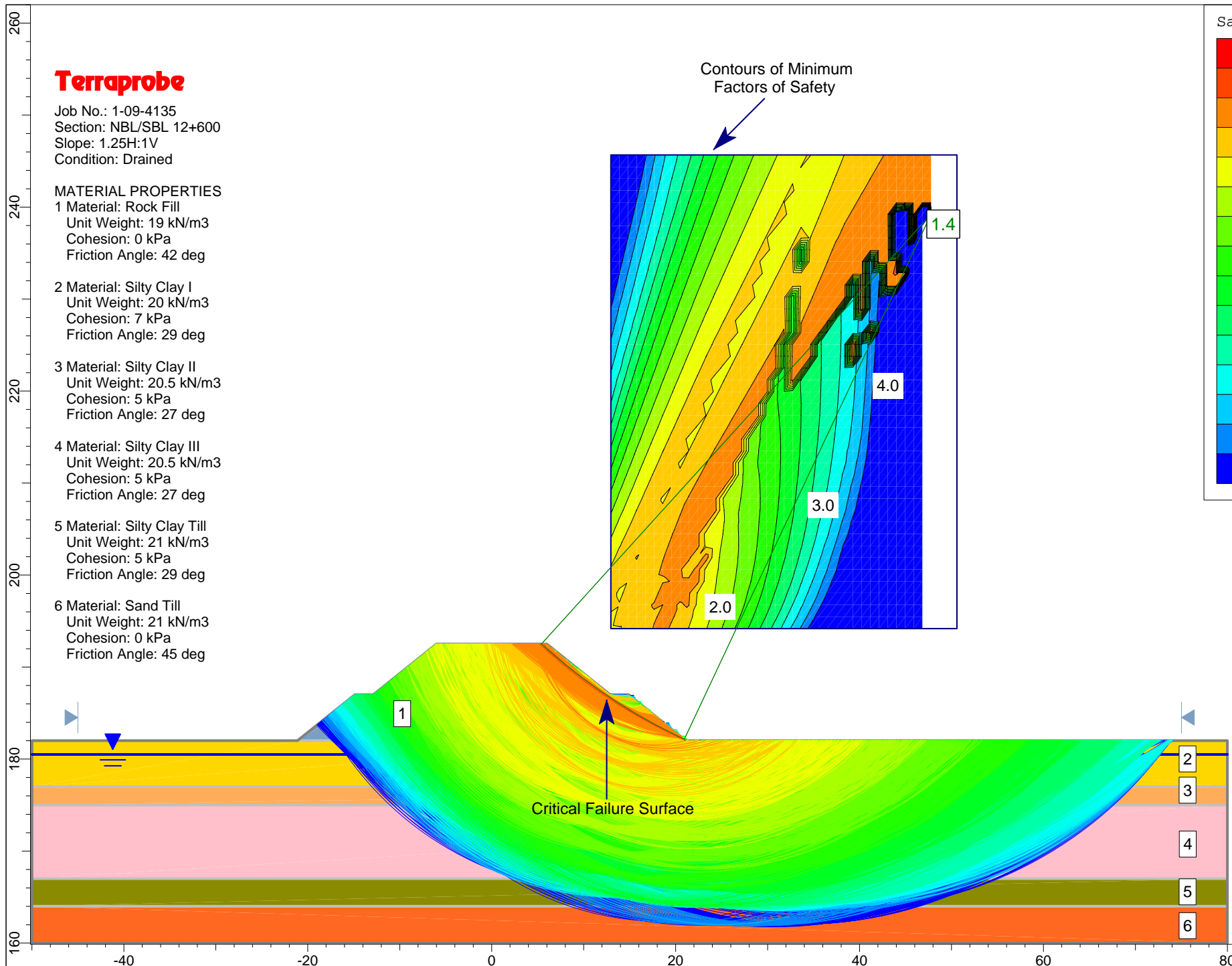
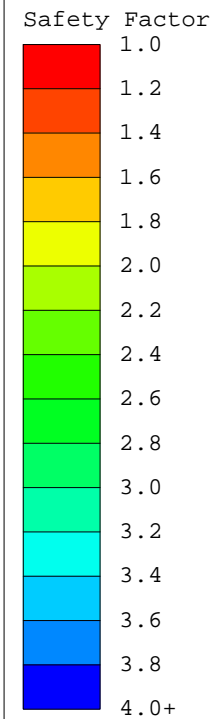
Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+600
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



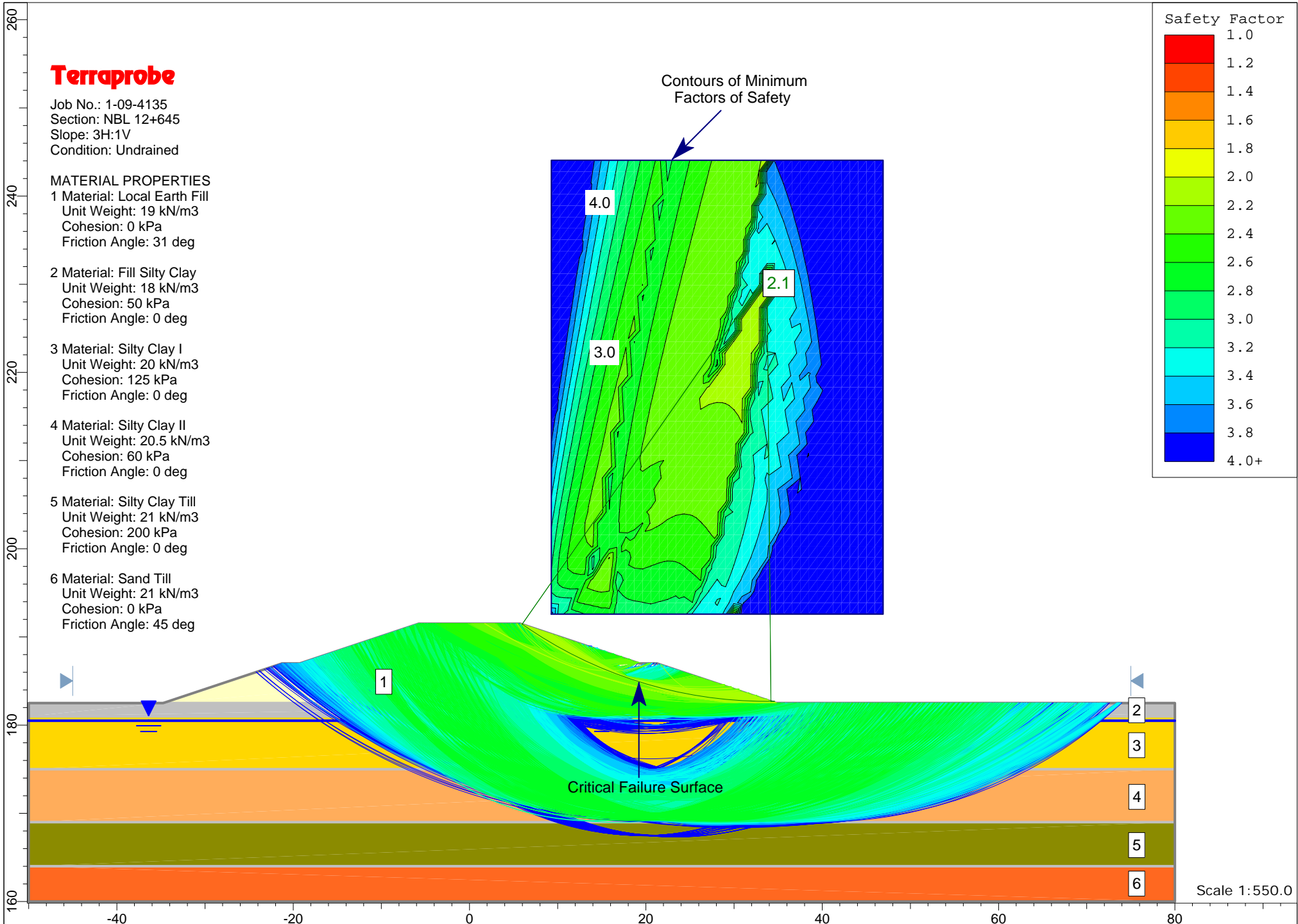
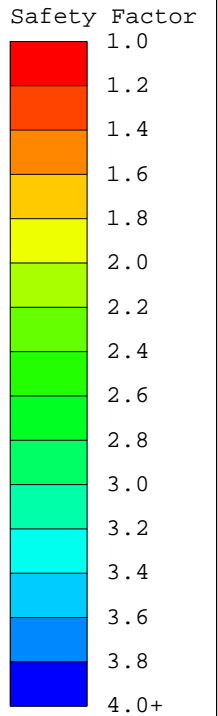
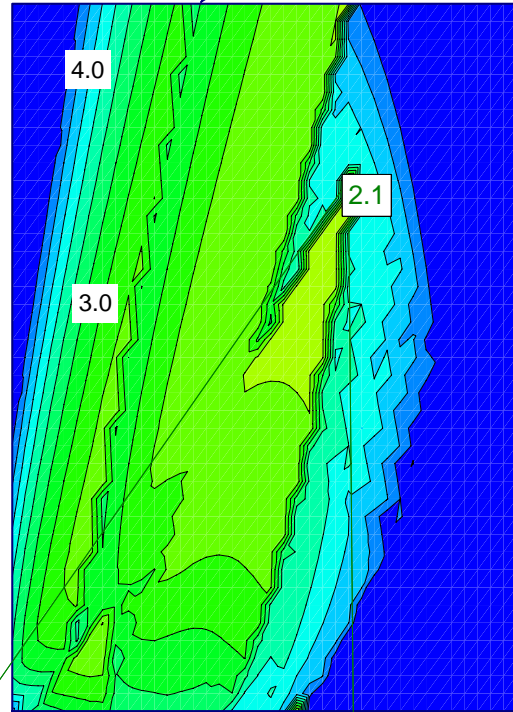
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+645
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

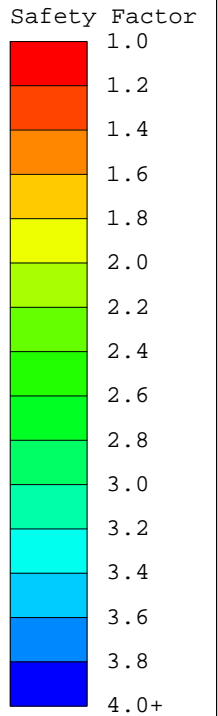


Terraprobe

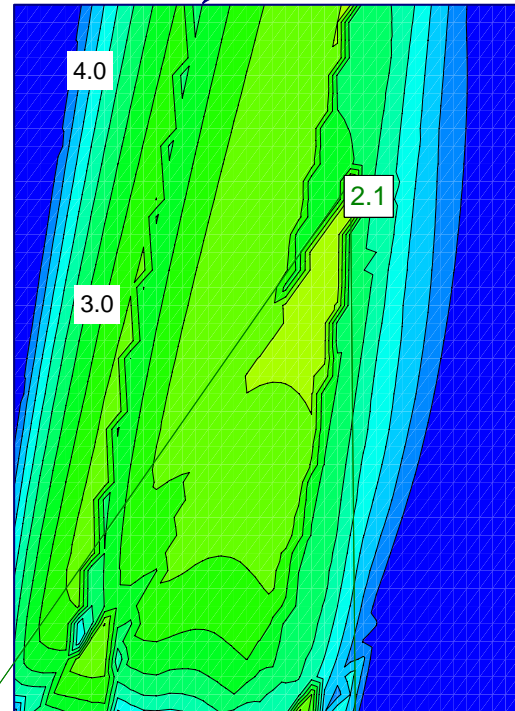
Job No.: 1-09-4135
Section: NBL 12+645
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum Factors of Safety



Critical Failure Surface

Scale 1:550.0

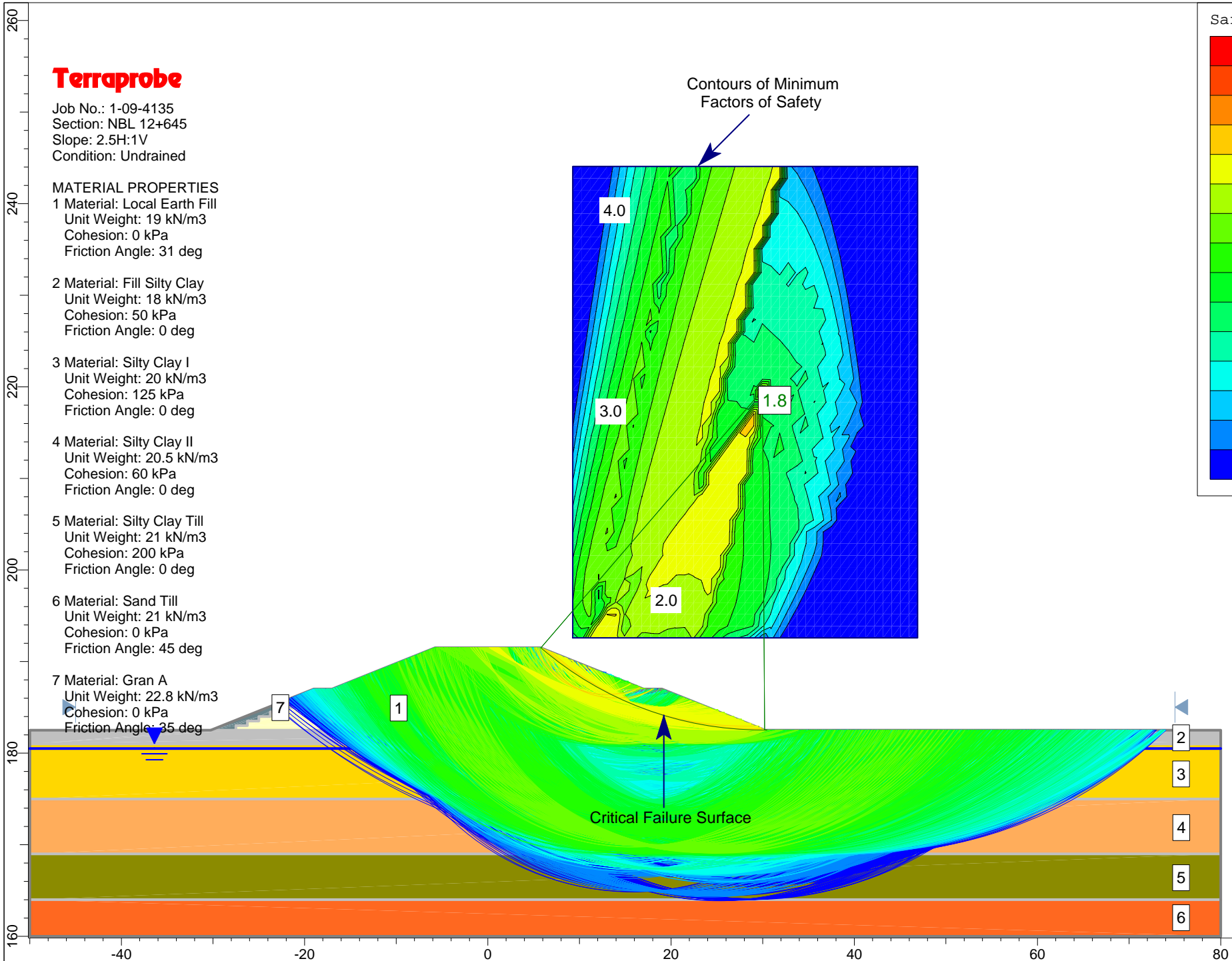
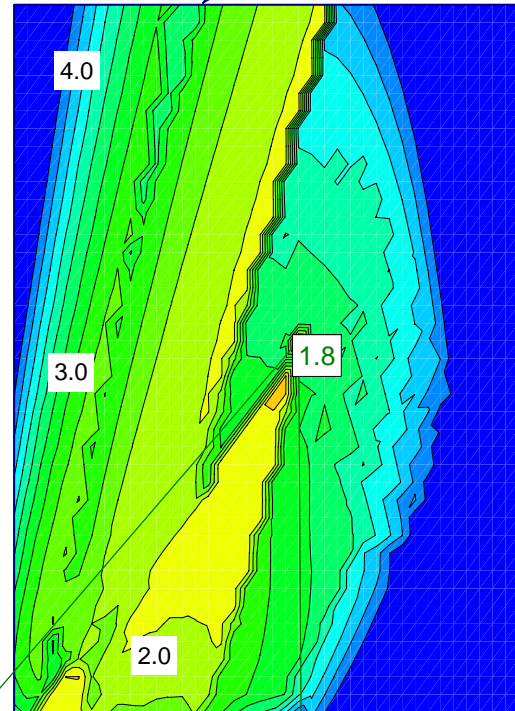
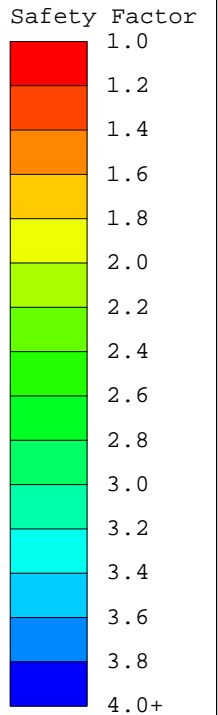
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+645
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg
- 7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

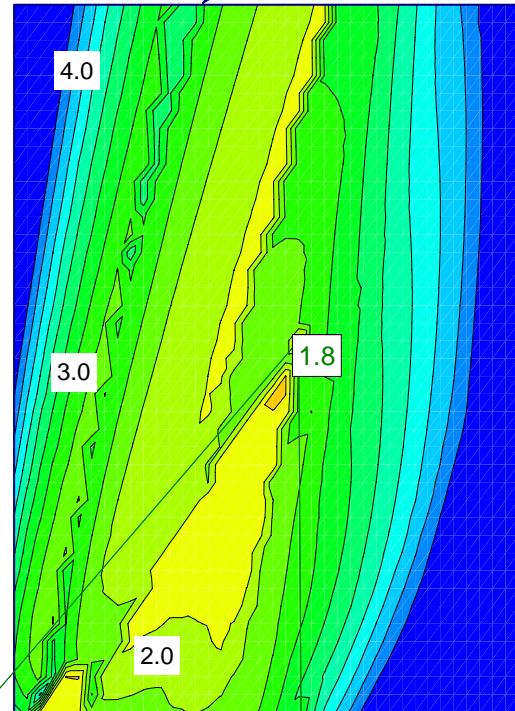
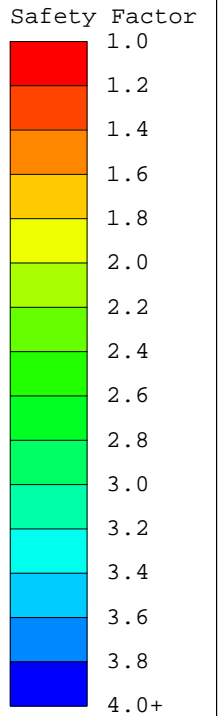
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+645
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg
- 7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

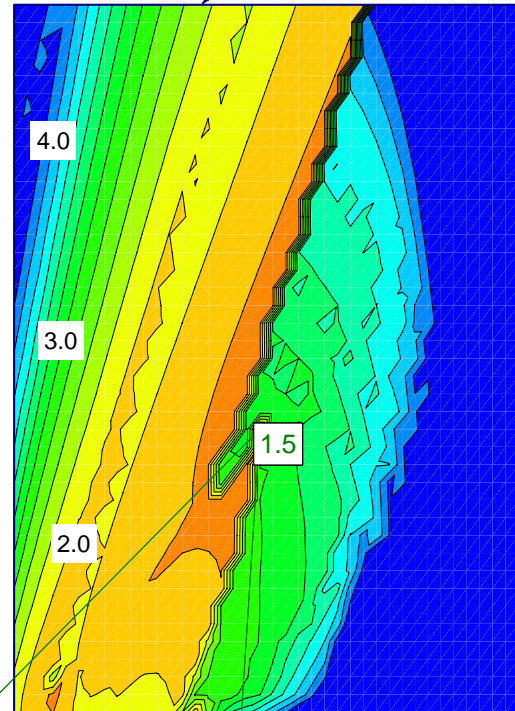
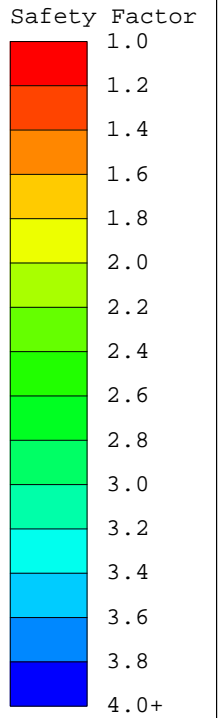
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+645
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

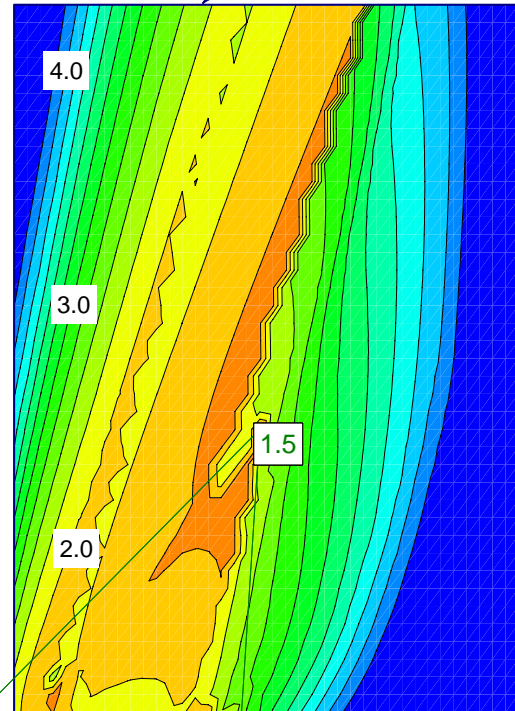
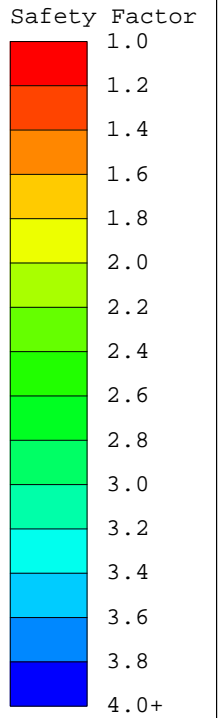
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+645
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

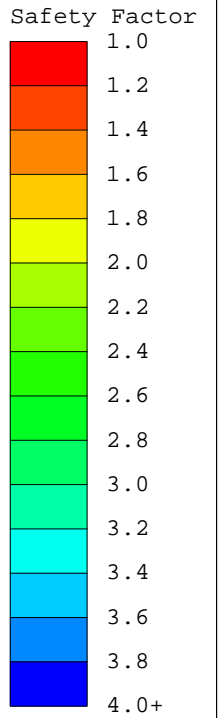
Scale 1:550.0

Terraprobe

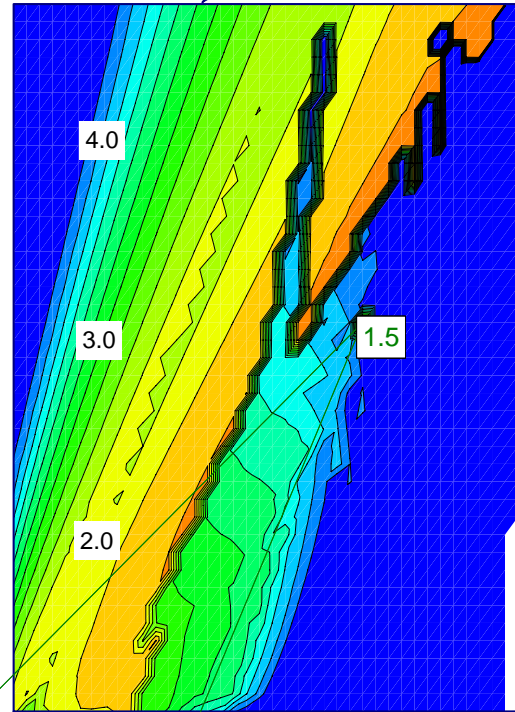
Job No.: 1-09-4135
Section: NBL 12+645
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 60 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

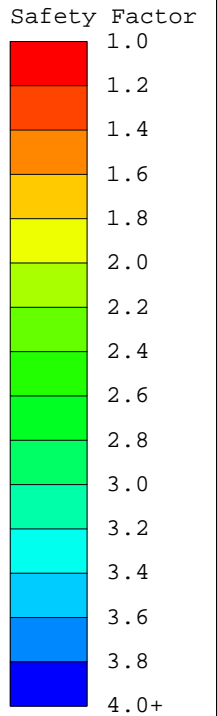
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Terraprobe

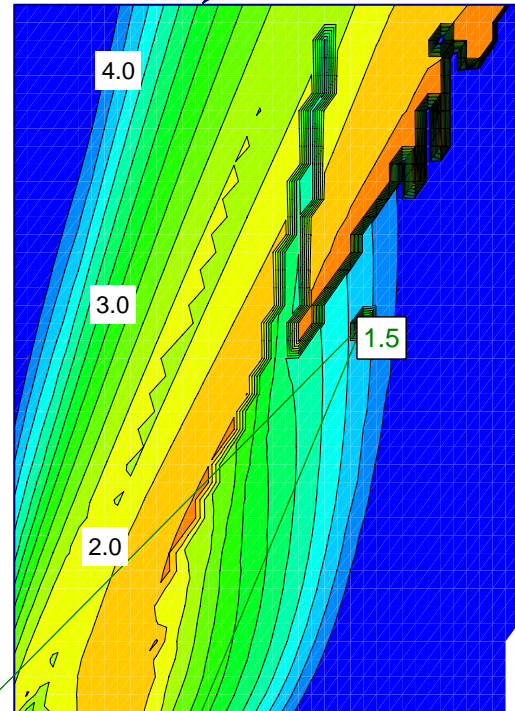
Job No.: 1-09-4135
Section: NBL 12+645
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

Job No.: 1-09-4135
Section: SBL 12+650
Slope: 3H:1V
Condition: Undrained

Job No.: 1-09-4135
Section: SBL 12+650
Slope: 3H:1V
Condition: Undrained

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

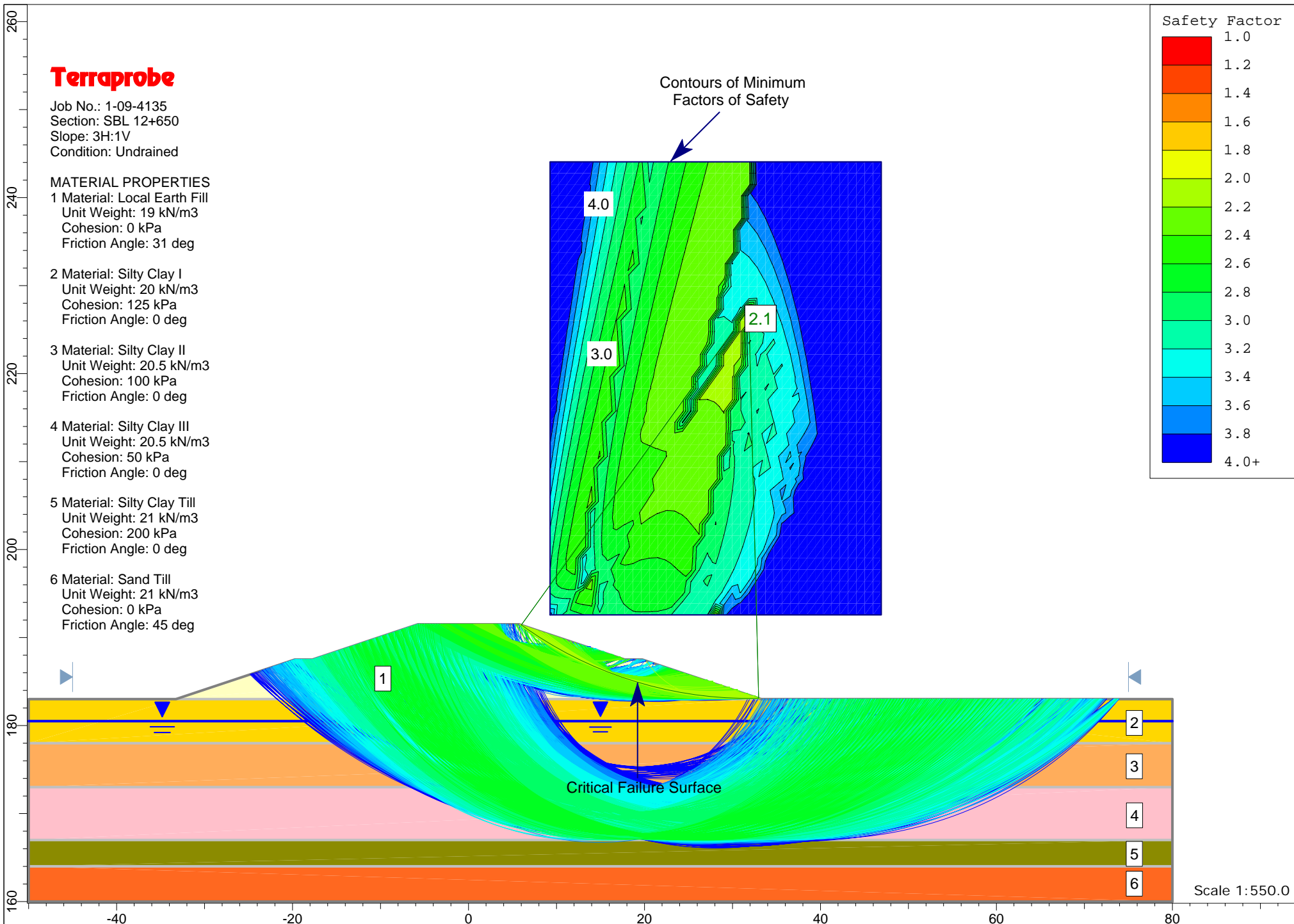
4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

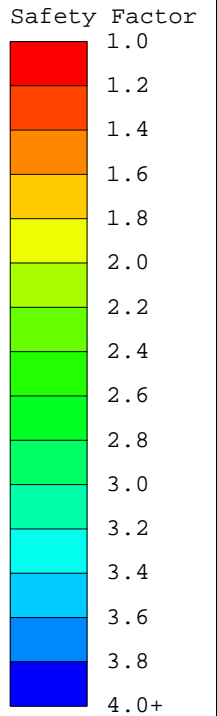


Terraprobe

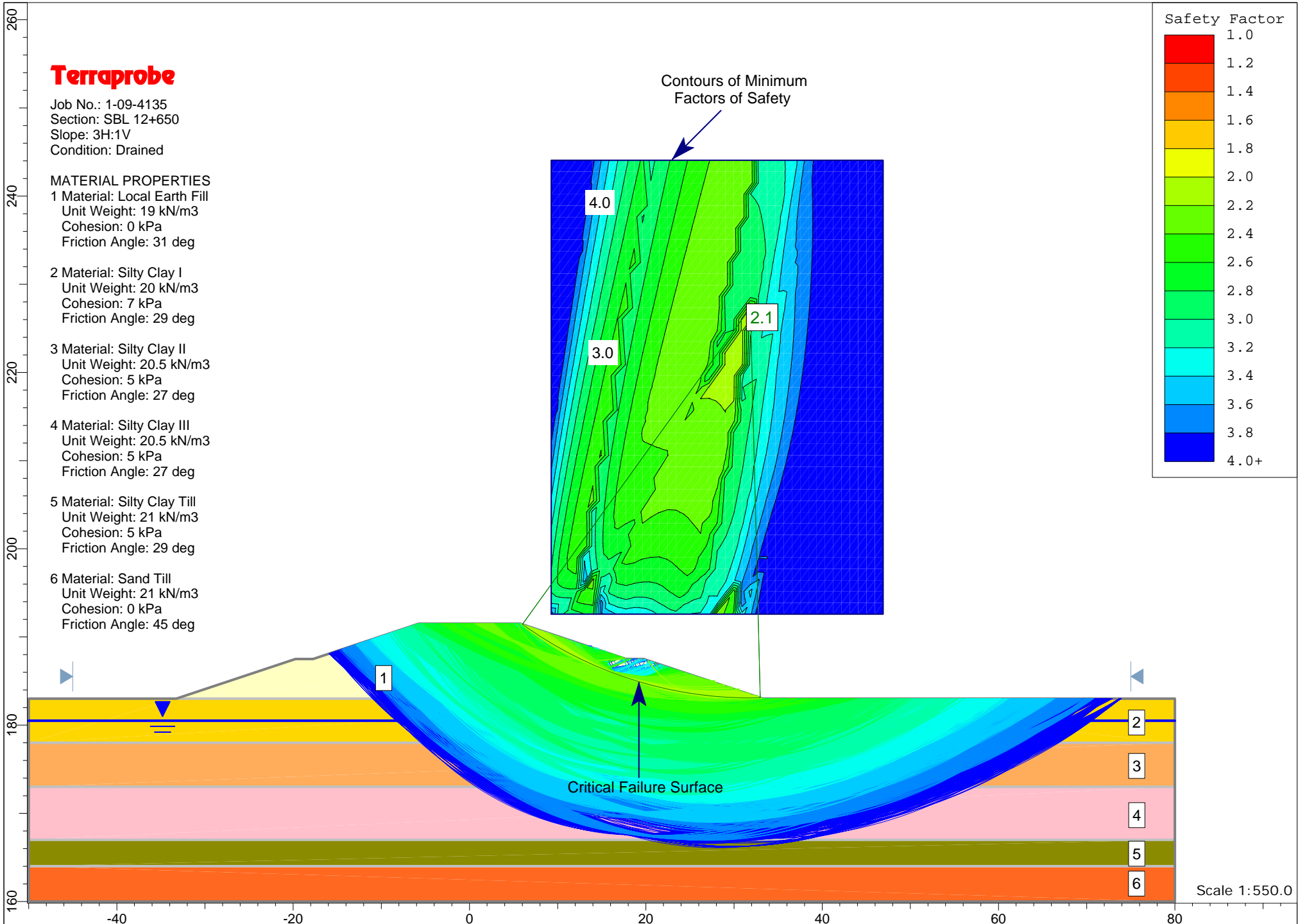
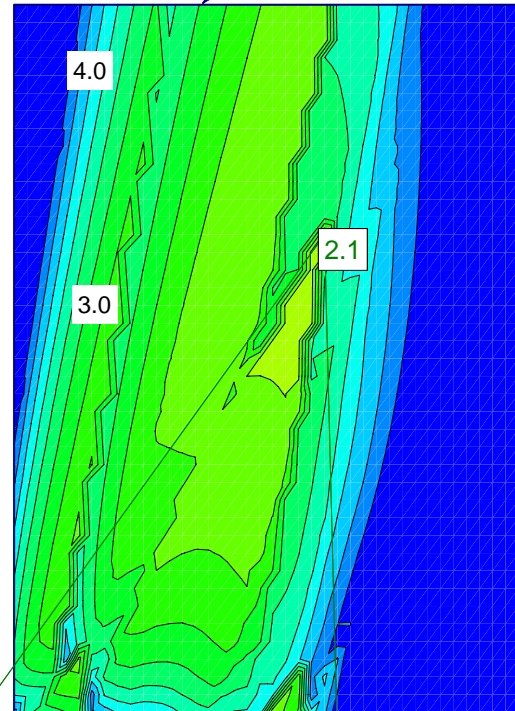
Job No.: 1-09-4135
Section: SBL 12+650
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum
Factors of Safety



Terraprobe

Job No.: 1-09-4135
Section: SBL 12+650
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

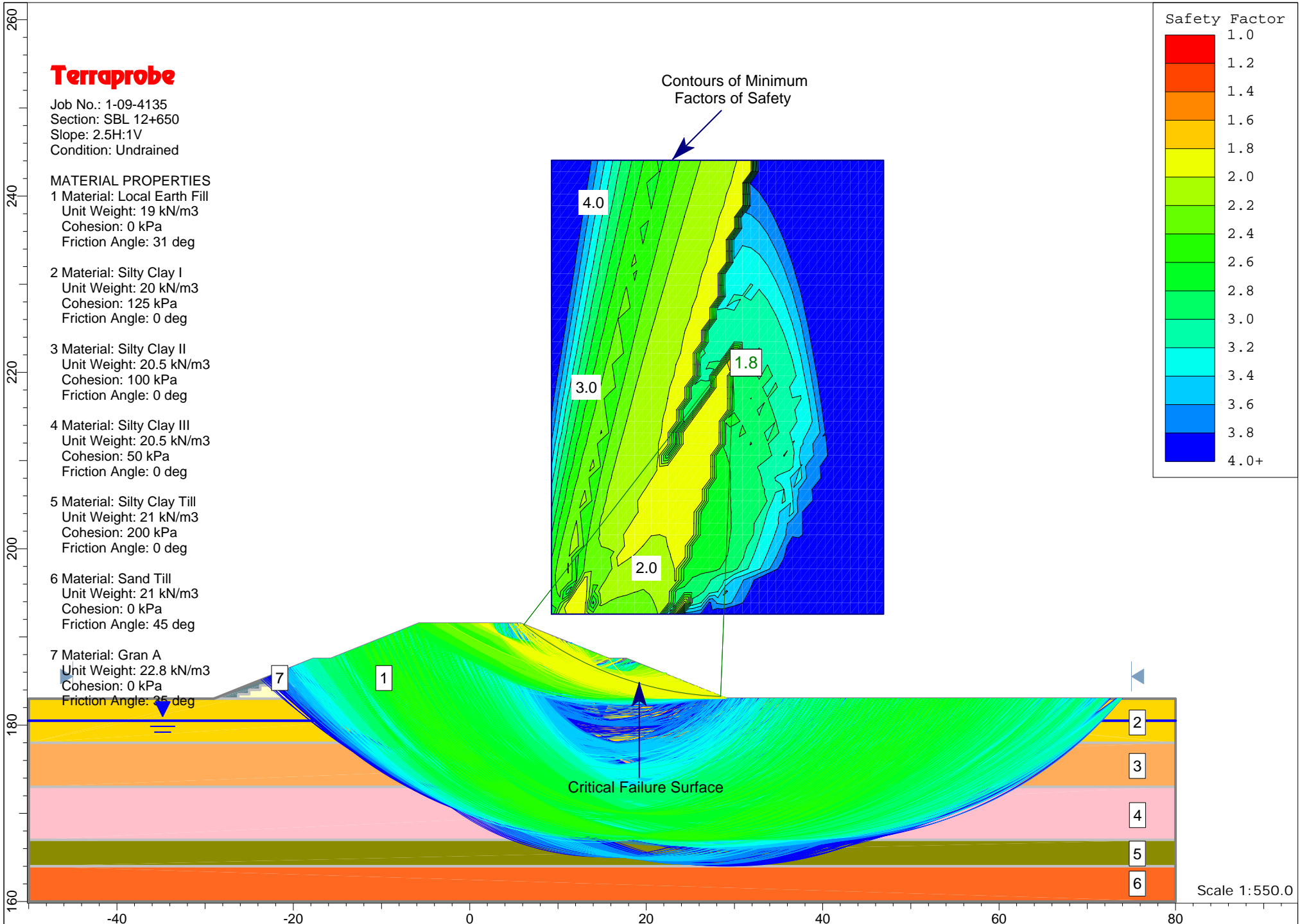
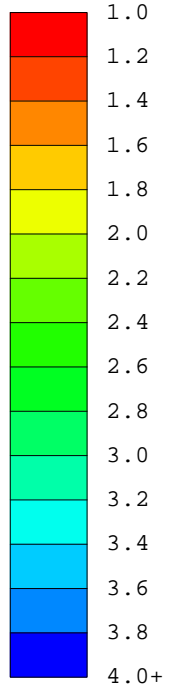
5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Terraprobe

Job No.: 1-09-4135
Section: SBL 12+650
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

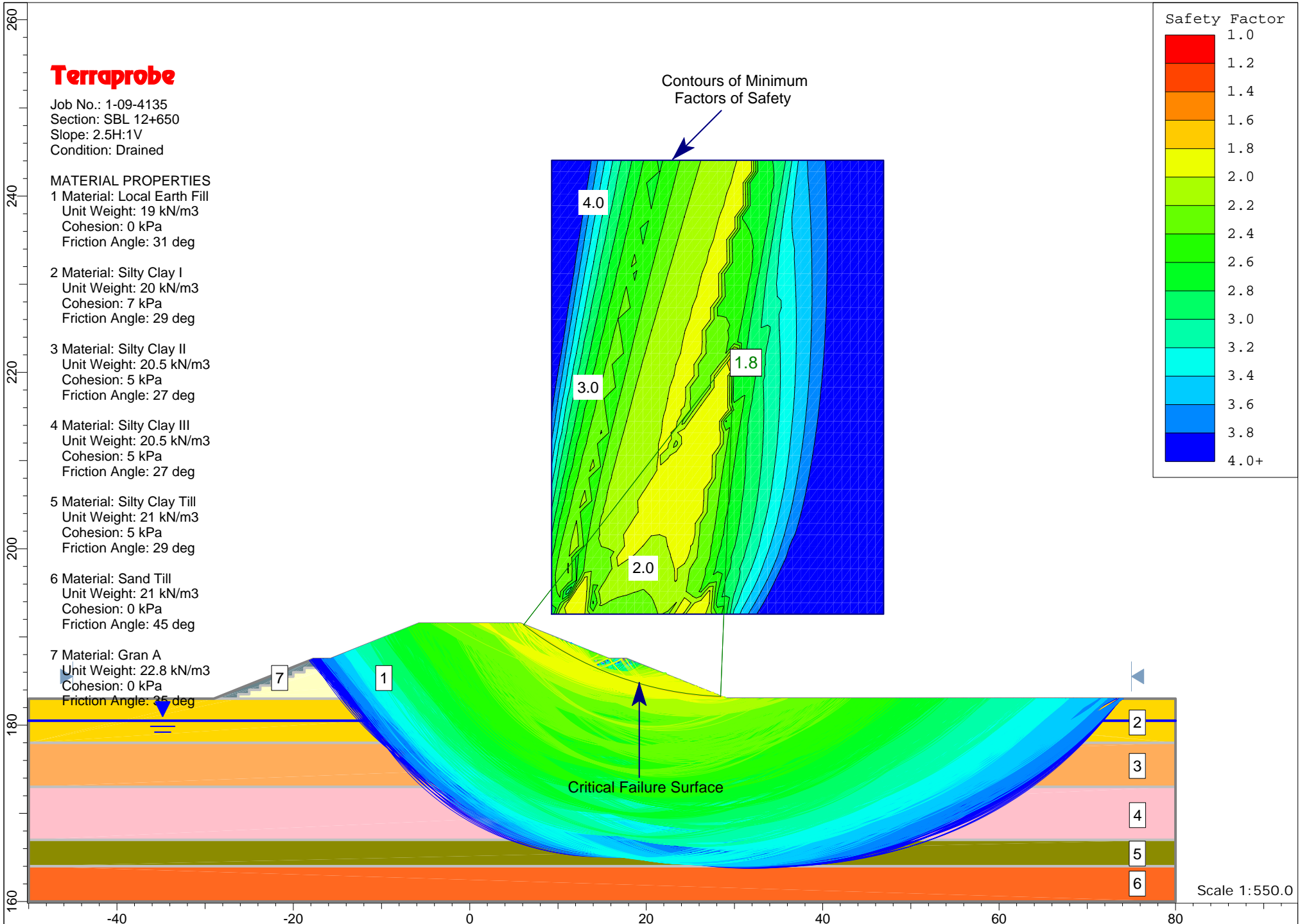
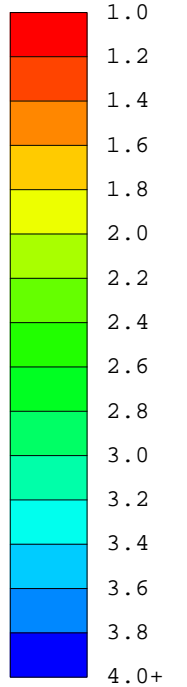
5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



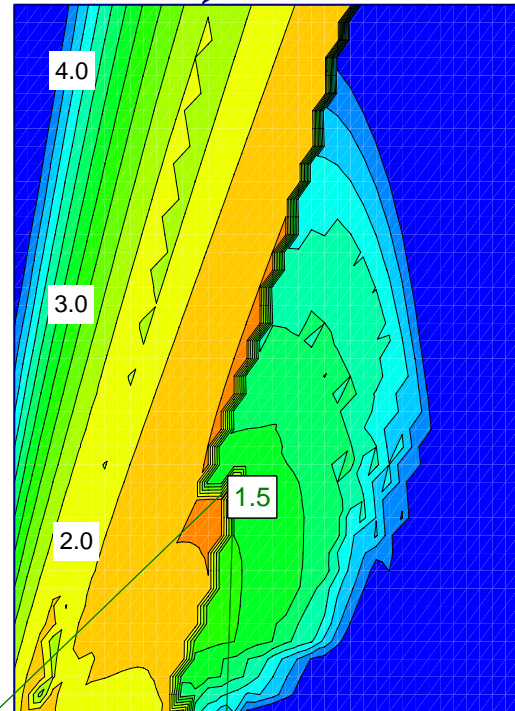
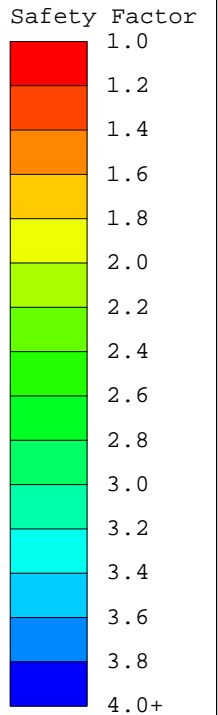
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+650
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

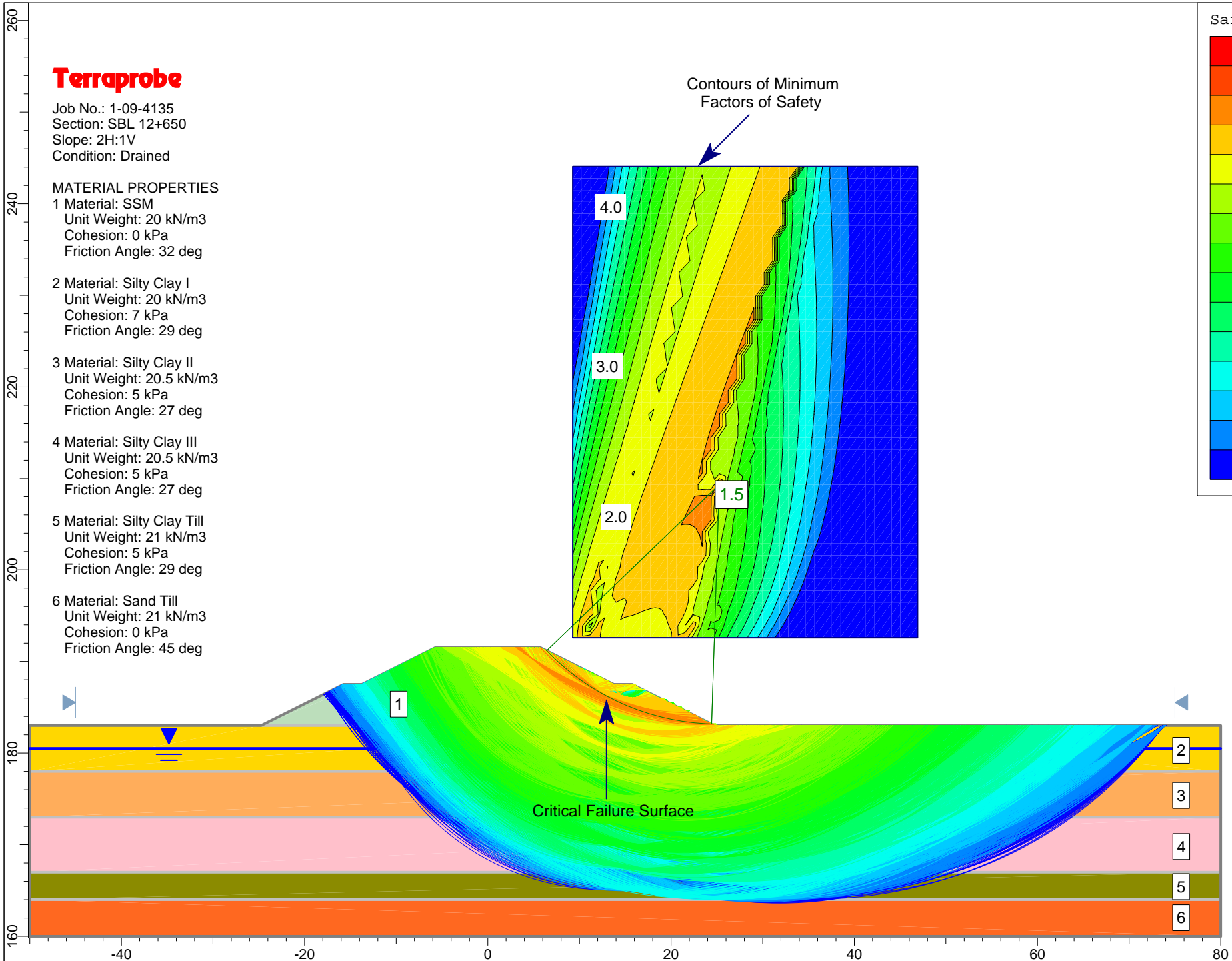
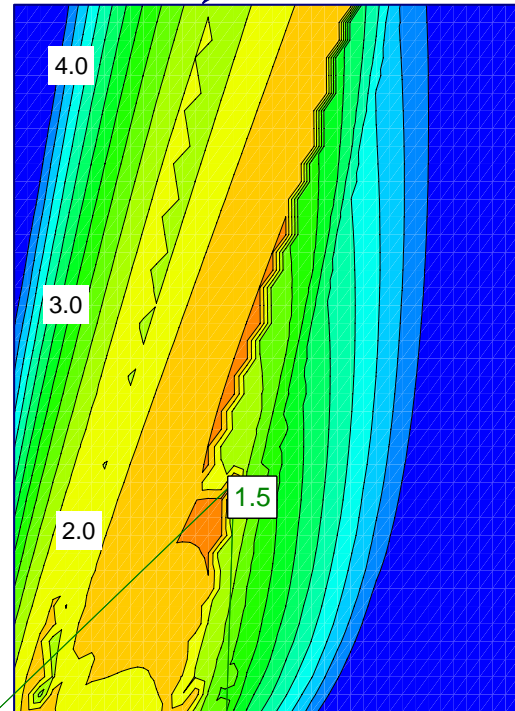
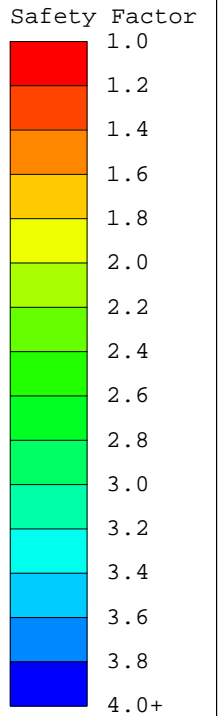
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+650
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

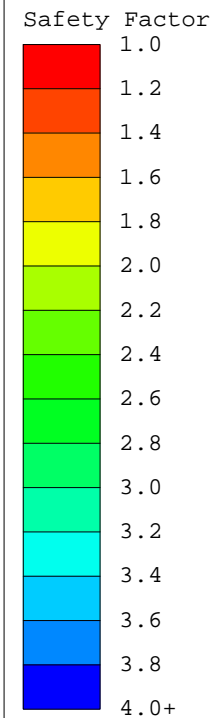


Terraprobe

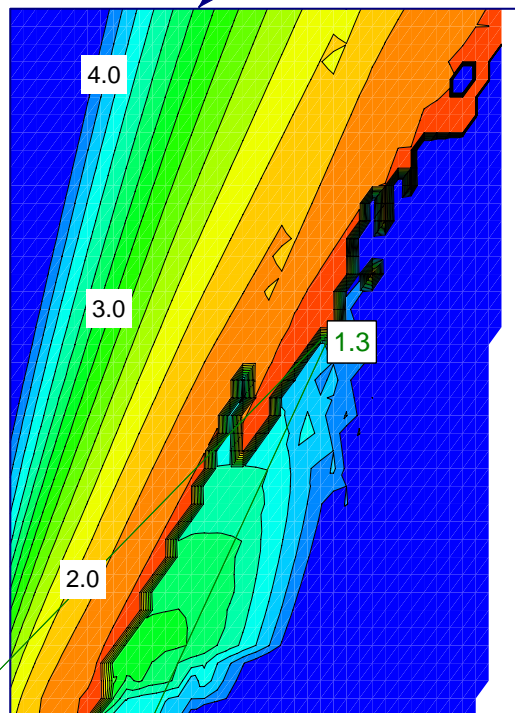
Job No.: 1-09-4135
Section: SBL 12+650
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 125 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum
Factors of Safety



Critical Failure Surface

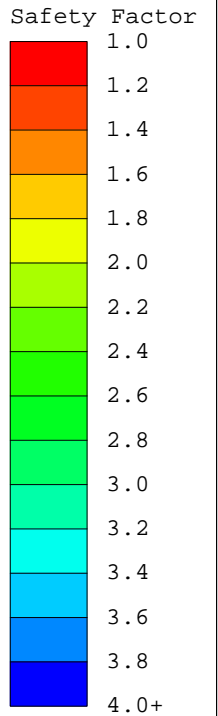
Scale 1:550.0

Terraprobe

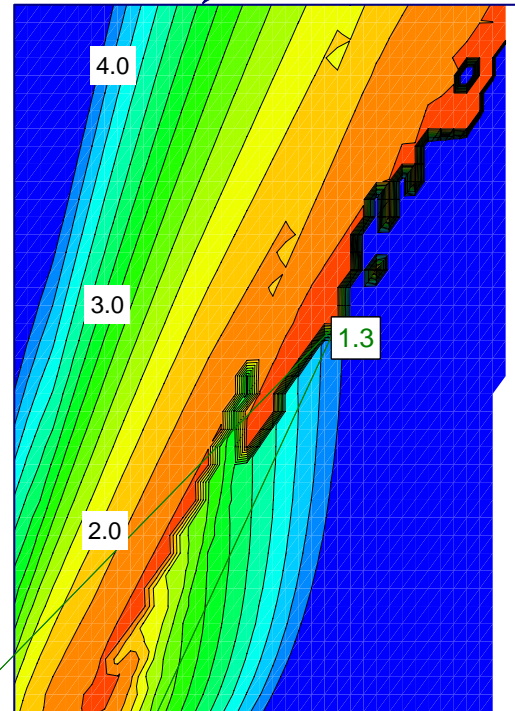
Job No.: 1-09-4135
Section: SBL 12+650
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum Factors of Safety



Critical Failure Surface

Scale 1:550.0

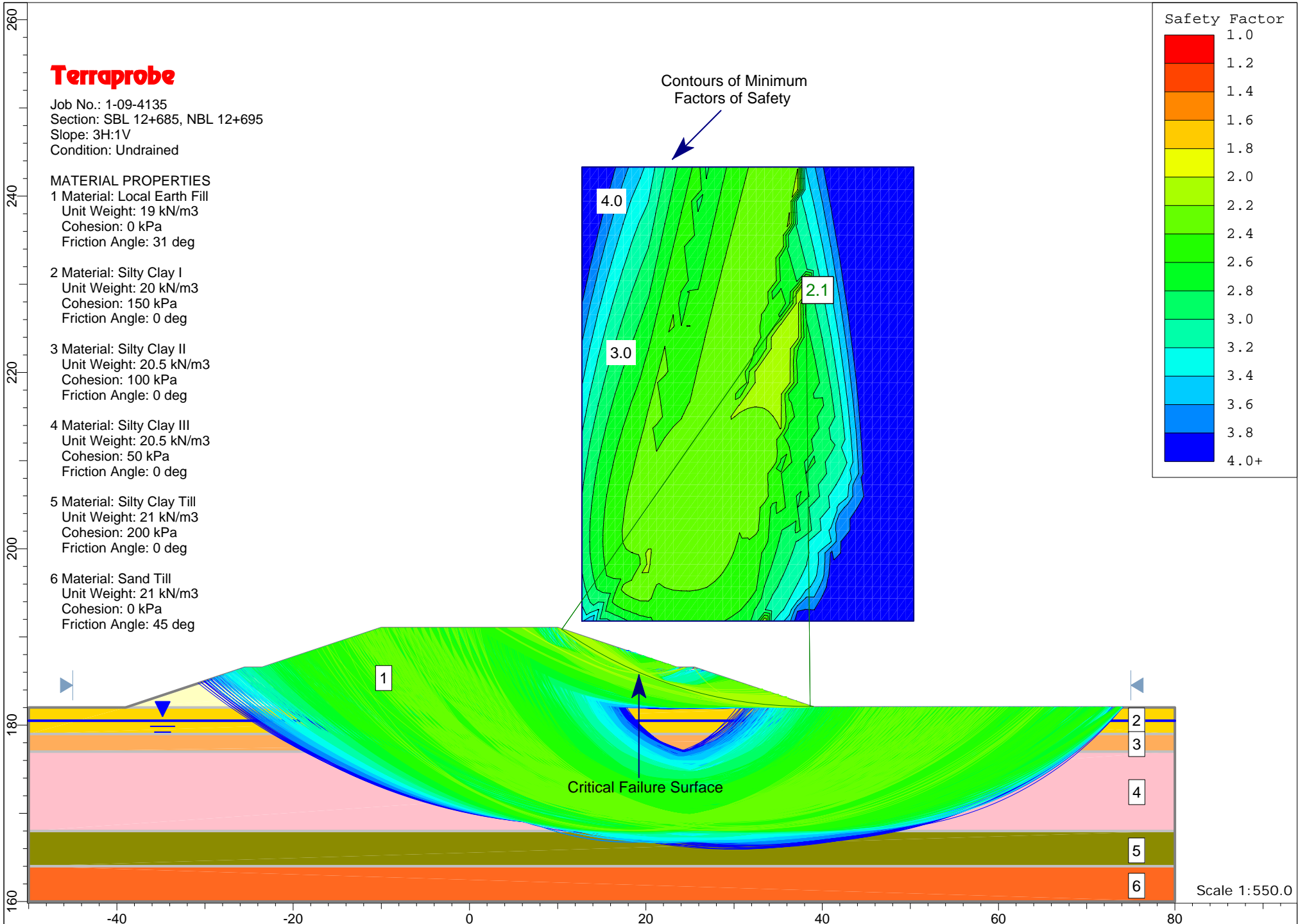
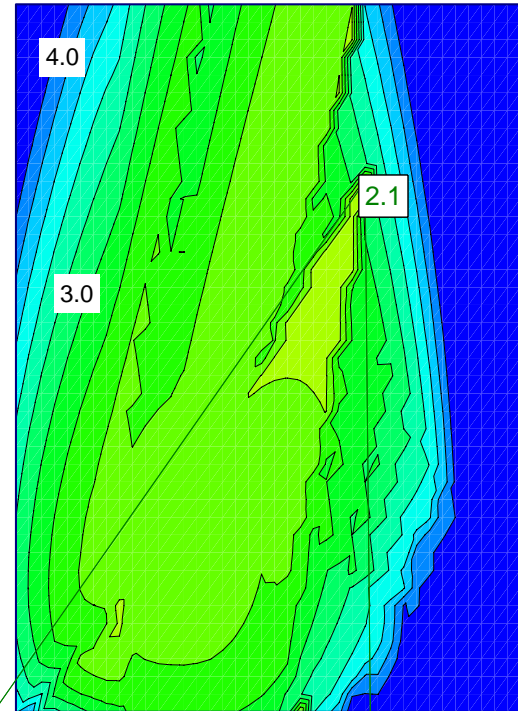
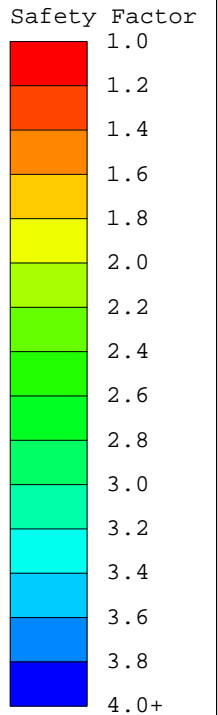
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+685, NBL 12+695
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Terraprobe

Job No.: 1-09-4135
Section: SBL 12+685, NBL 12+695
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

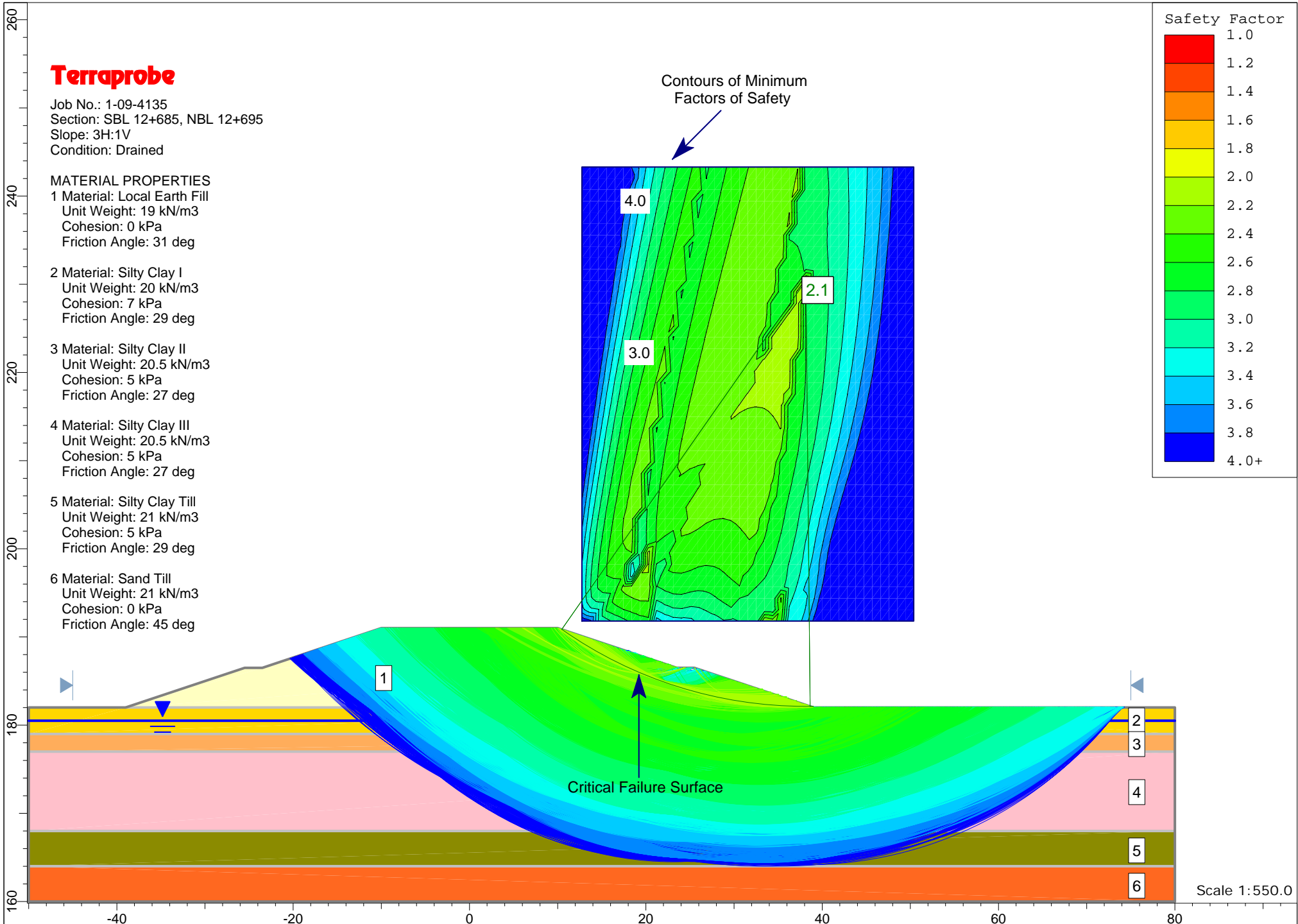
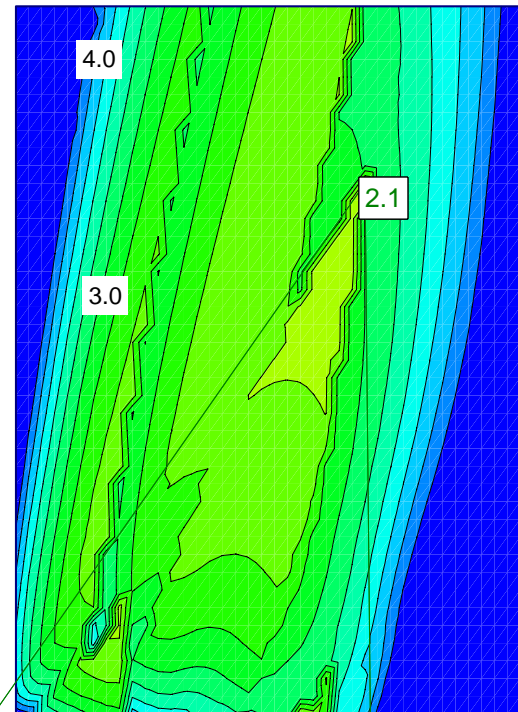
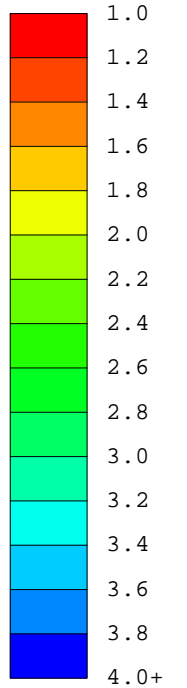
4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

Safety Factor



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+685, NBL 12+695
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

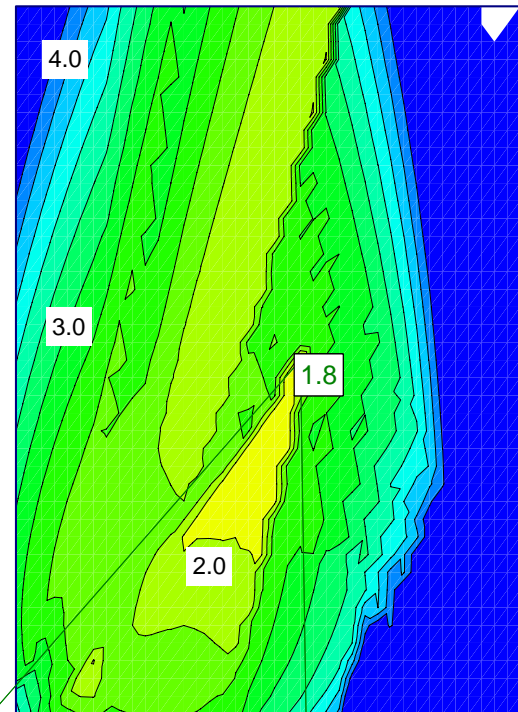
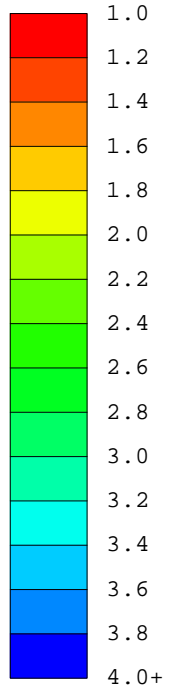
5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Critical Failure Surface

Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+685, NBL 12+695
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

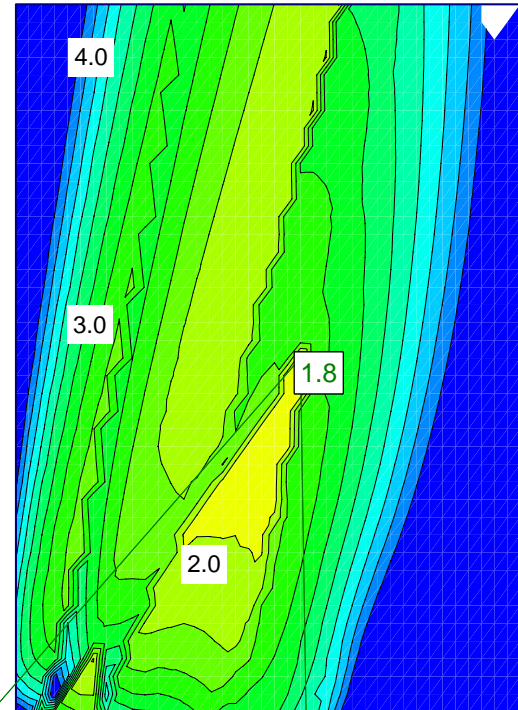
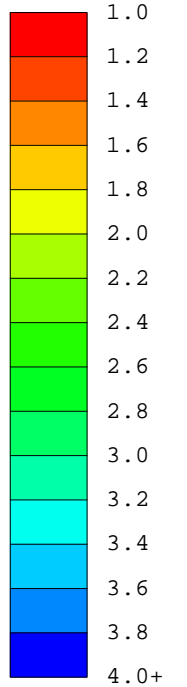
5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Critical Failure Surface

Scale 1:550.0

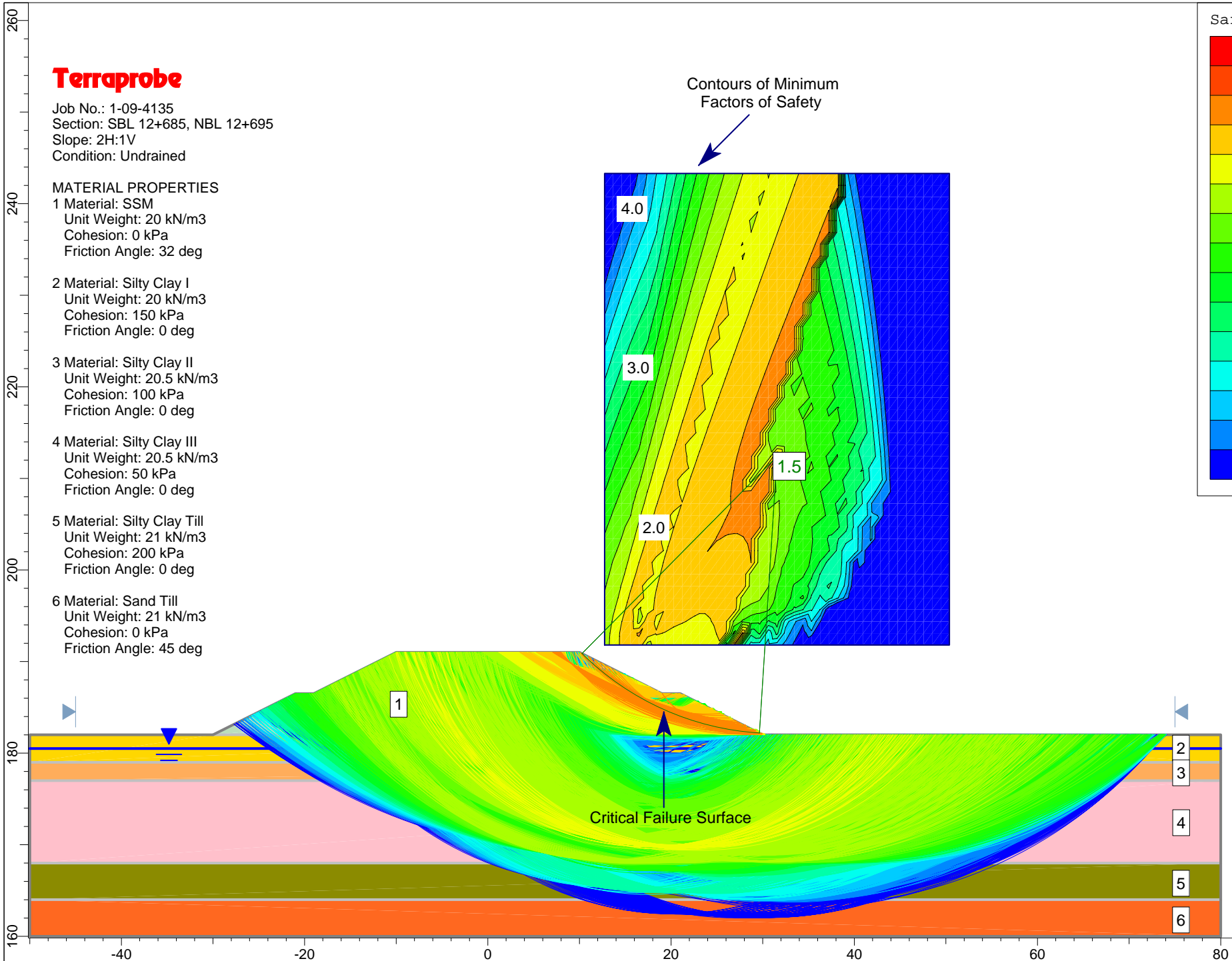
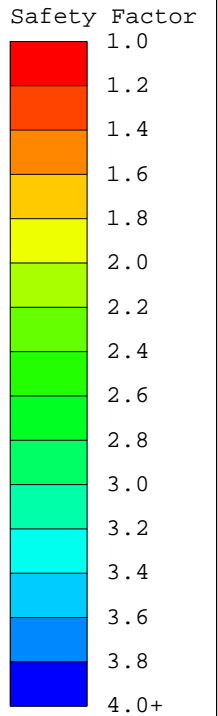
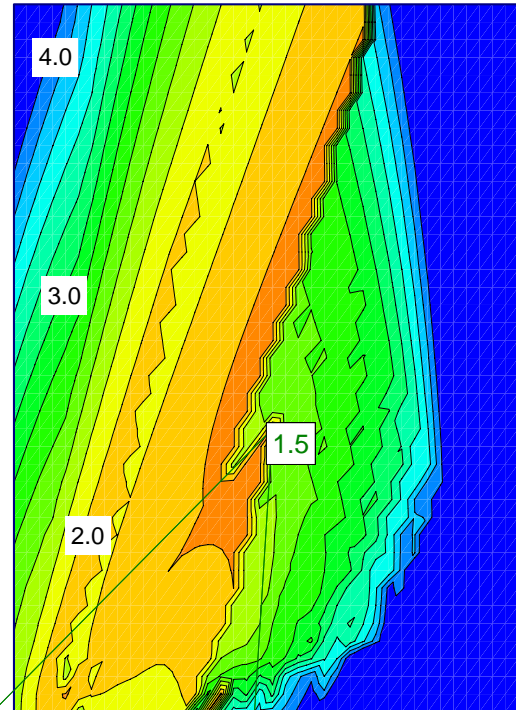
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+685, NBL 12+695
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

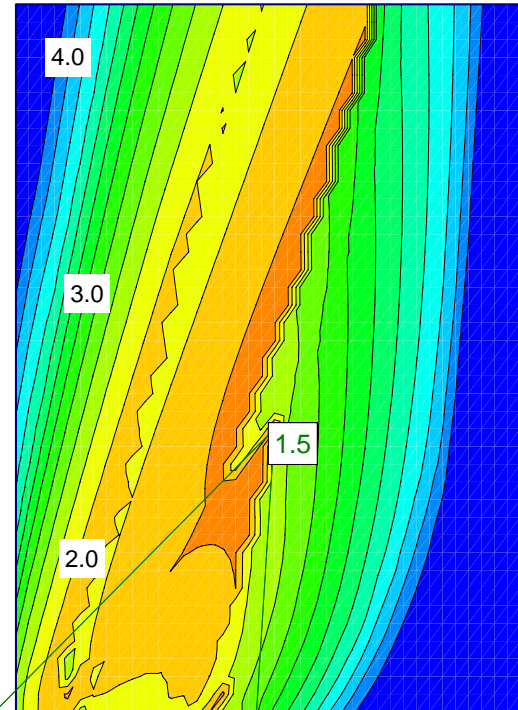
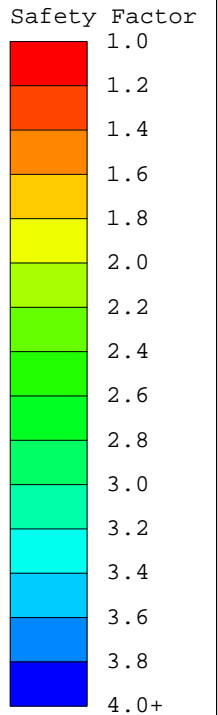
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+685, NBL 12+695
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Critical Failure Surface

Scale 1:550.0

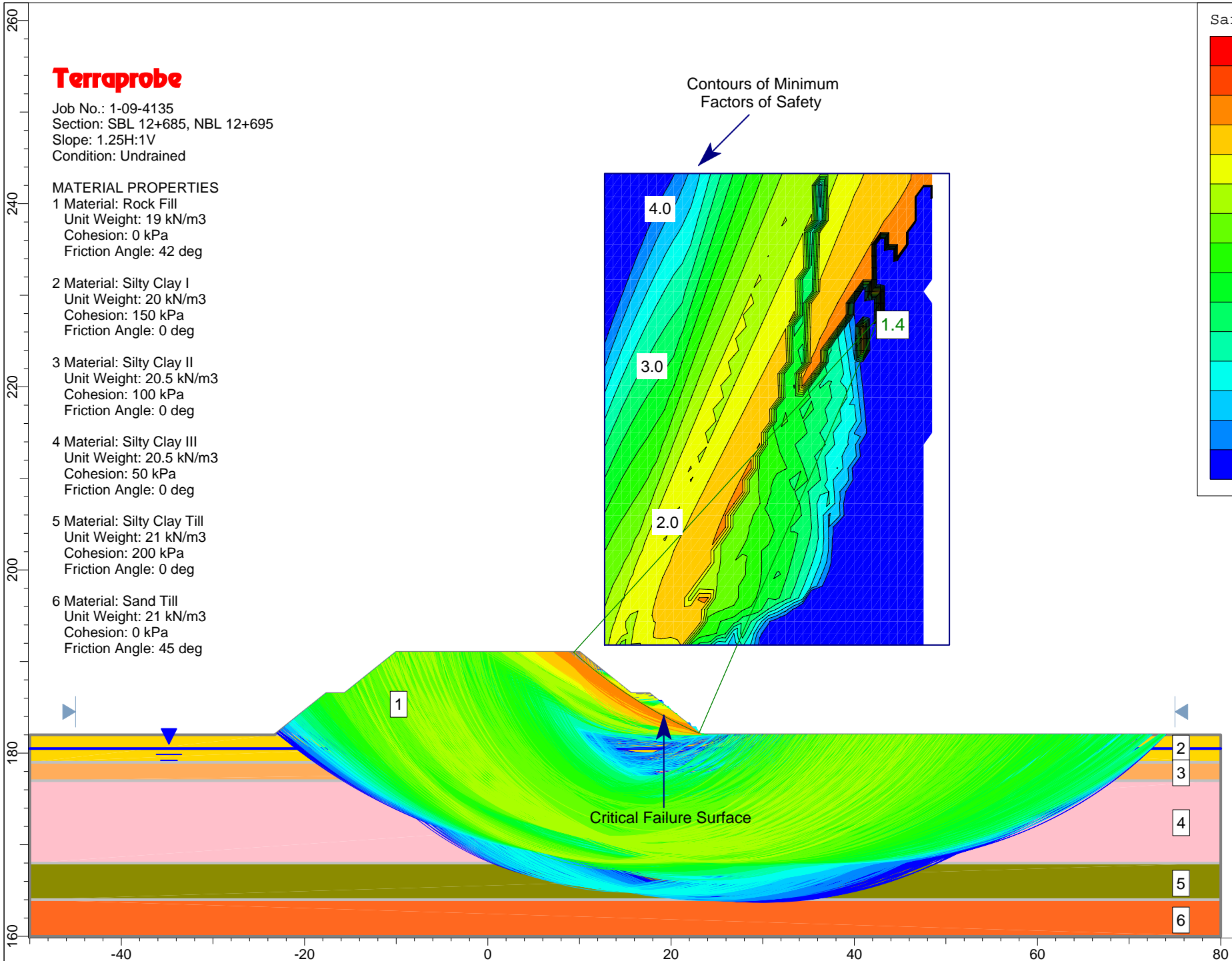
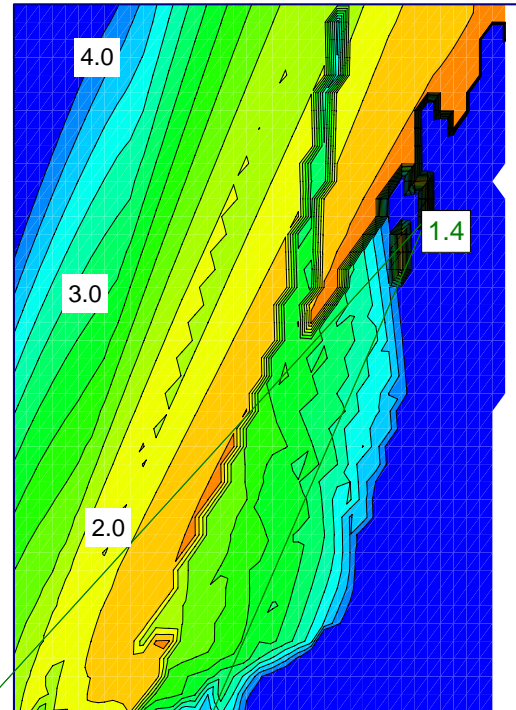
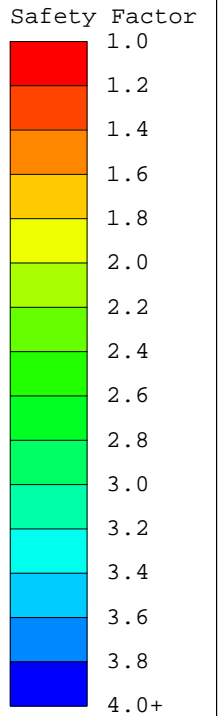
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+685, NBL 12+695
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



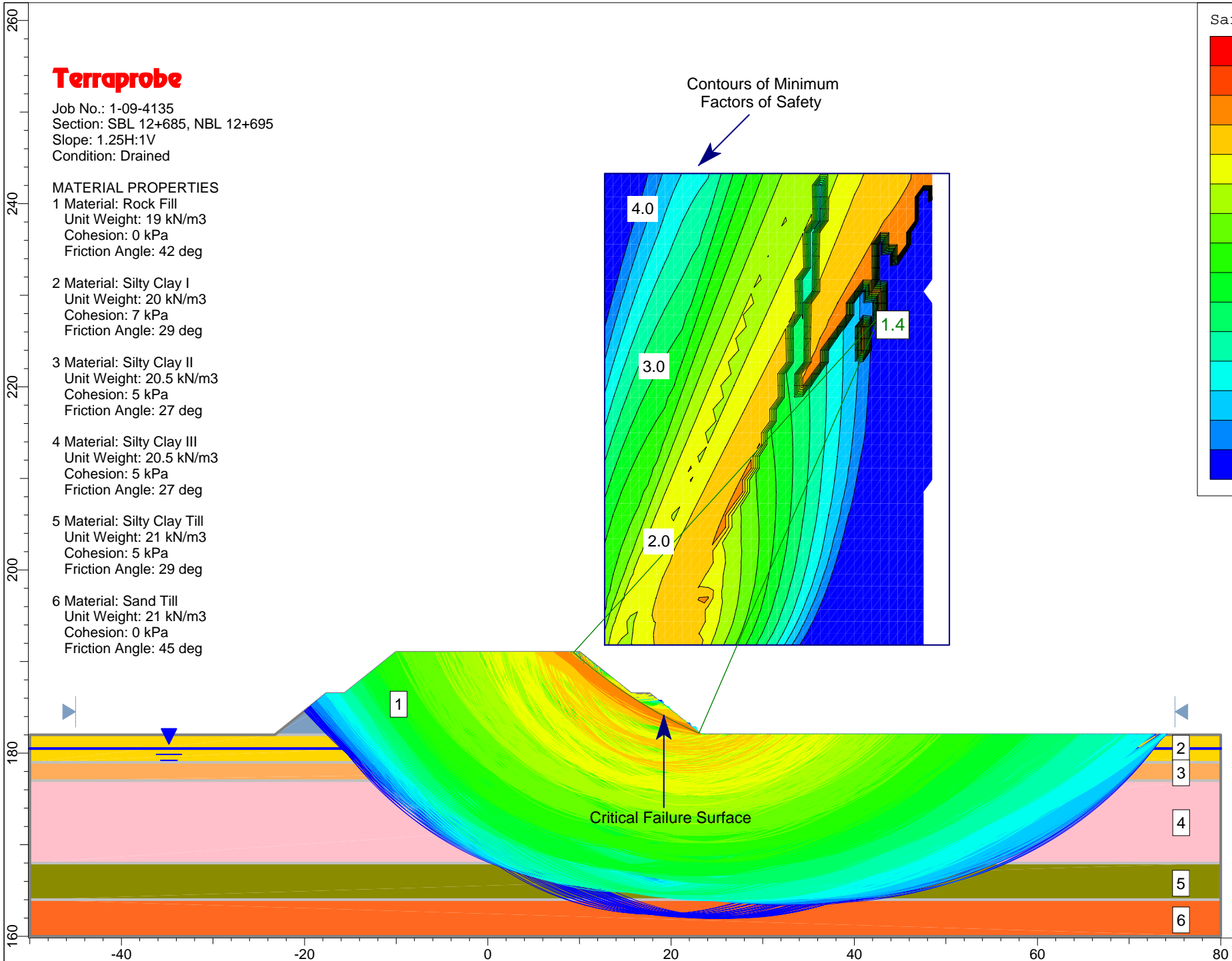
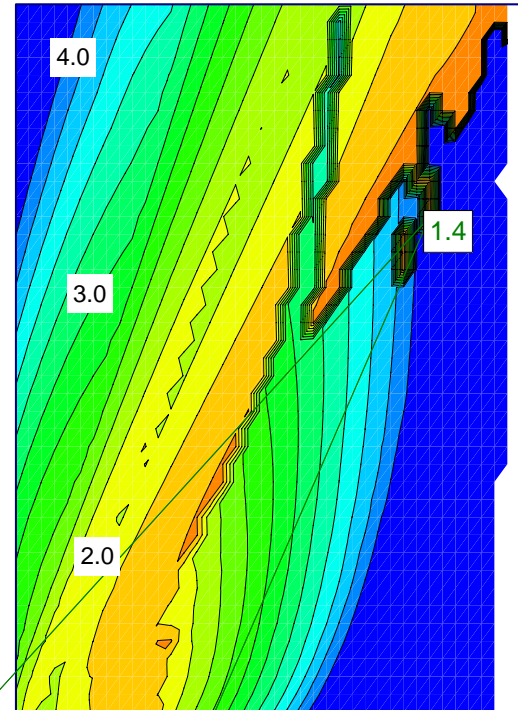
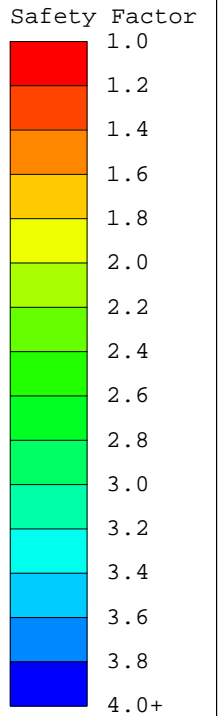
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+685, NBL 12+695
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+825
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

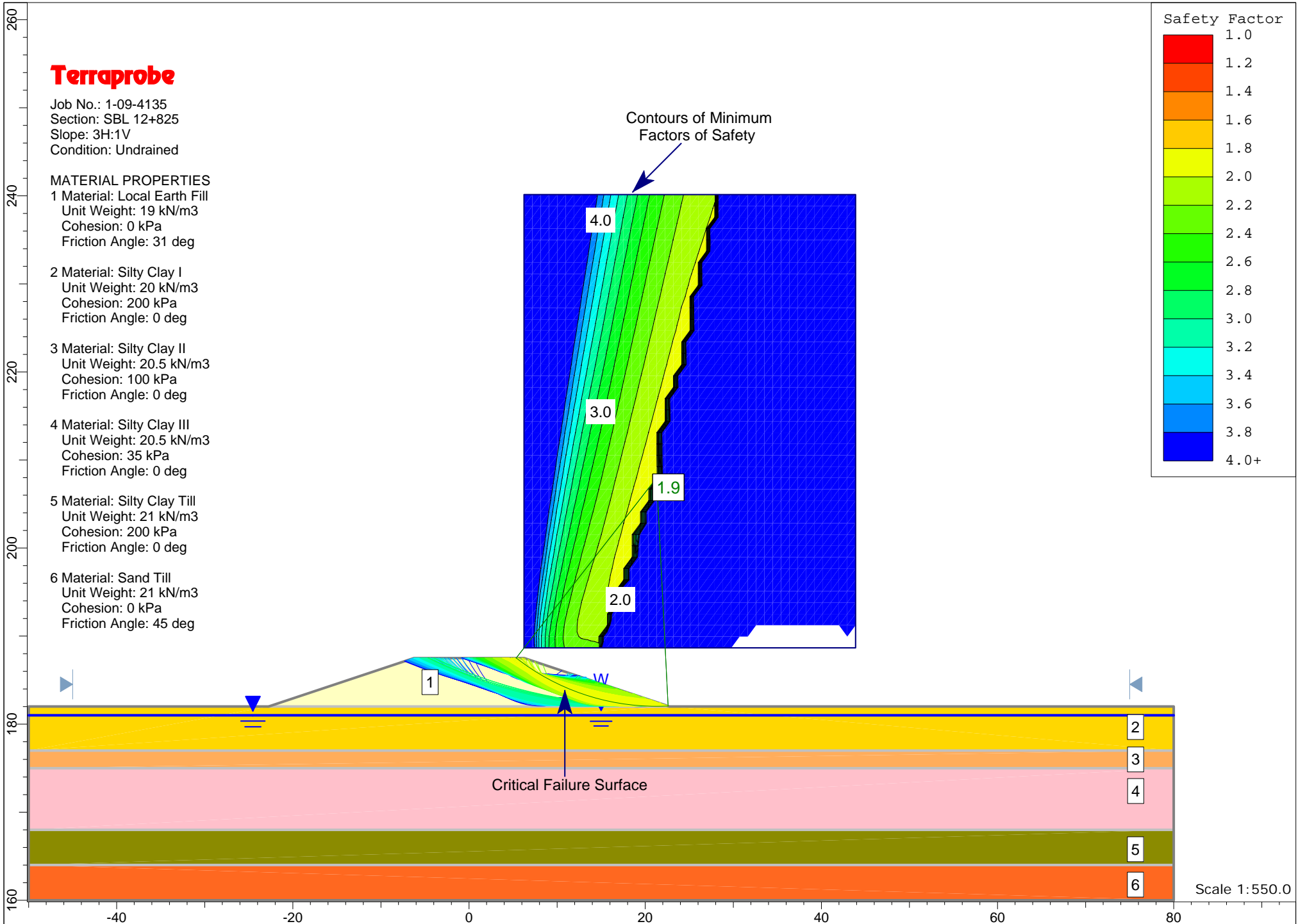
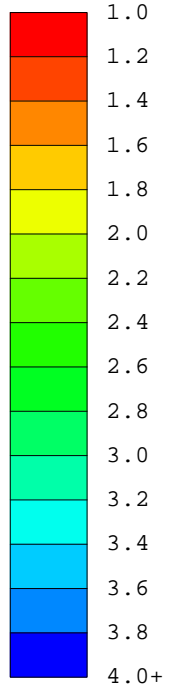
4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 35 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

Safety Factor



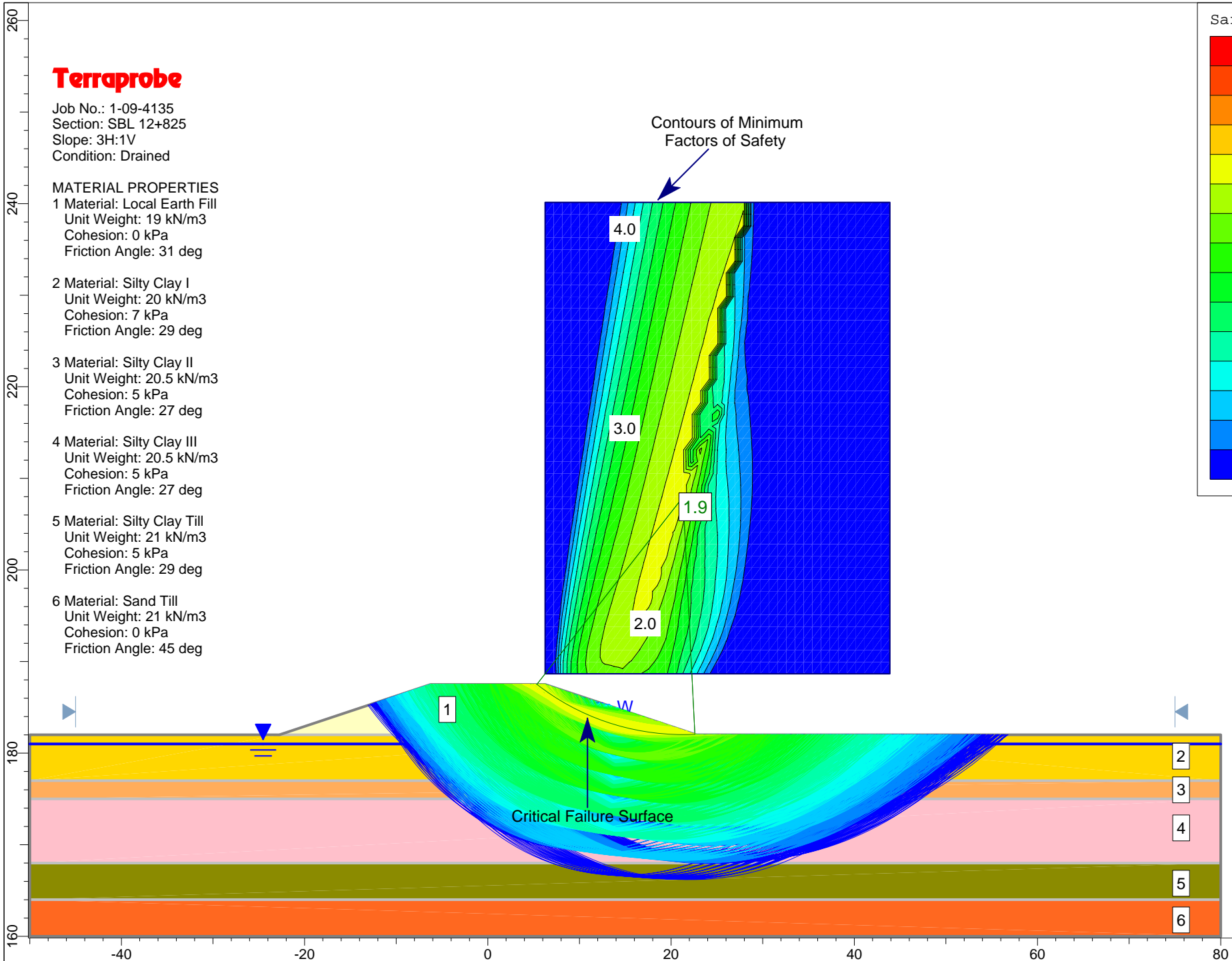
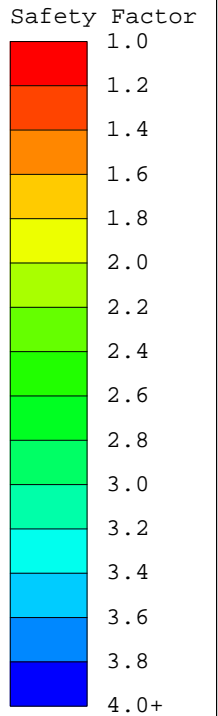
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+825
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: SBL 12+825
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

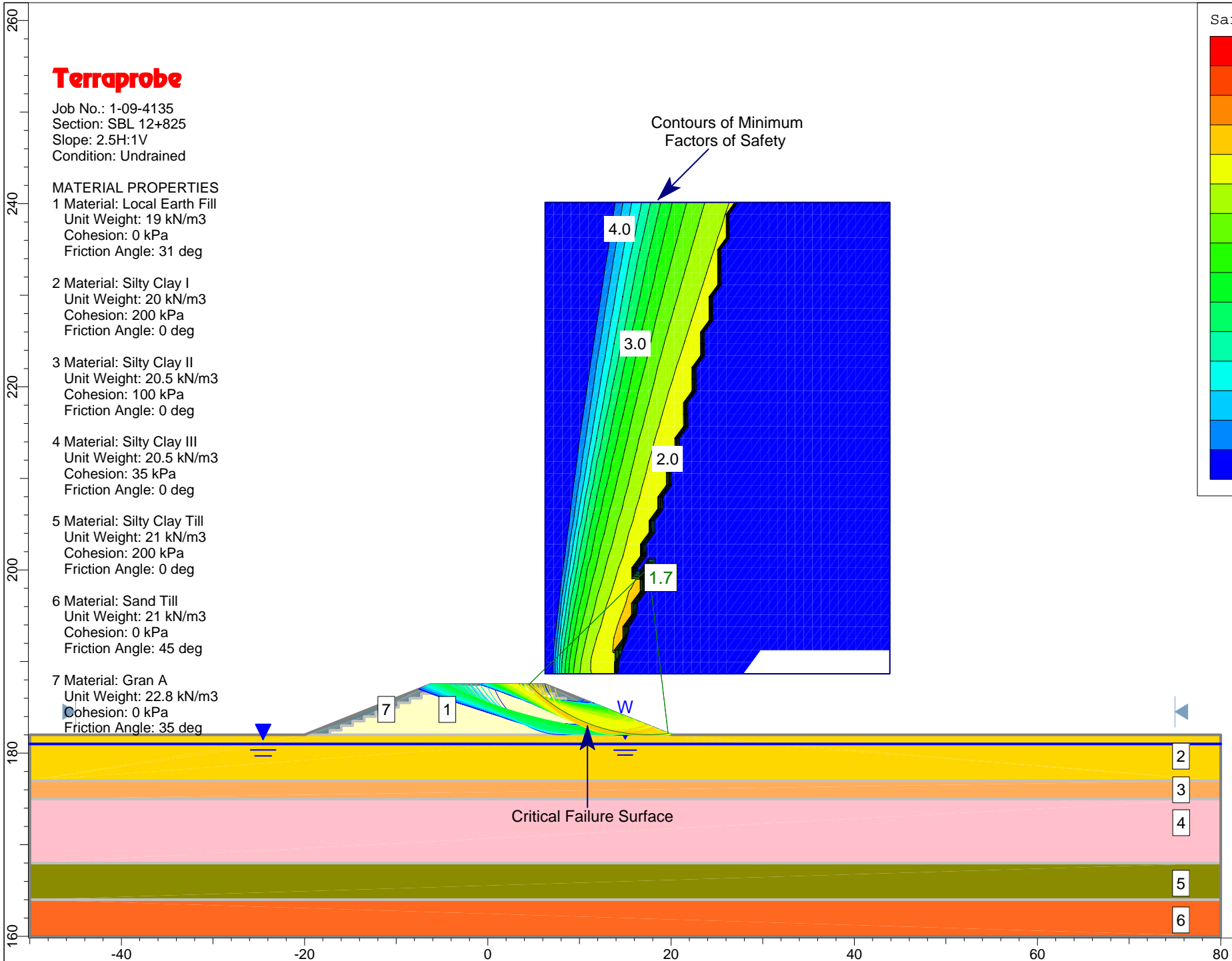
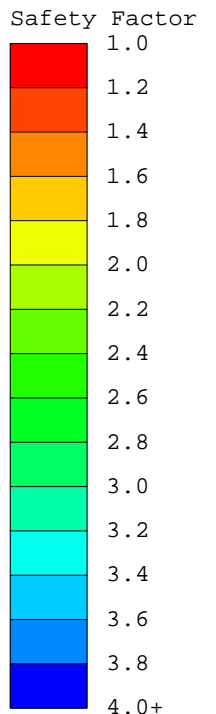
4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 35 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



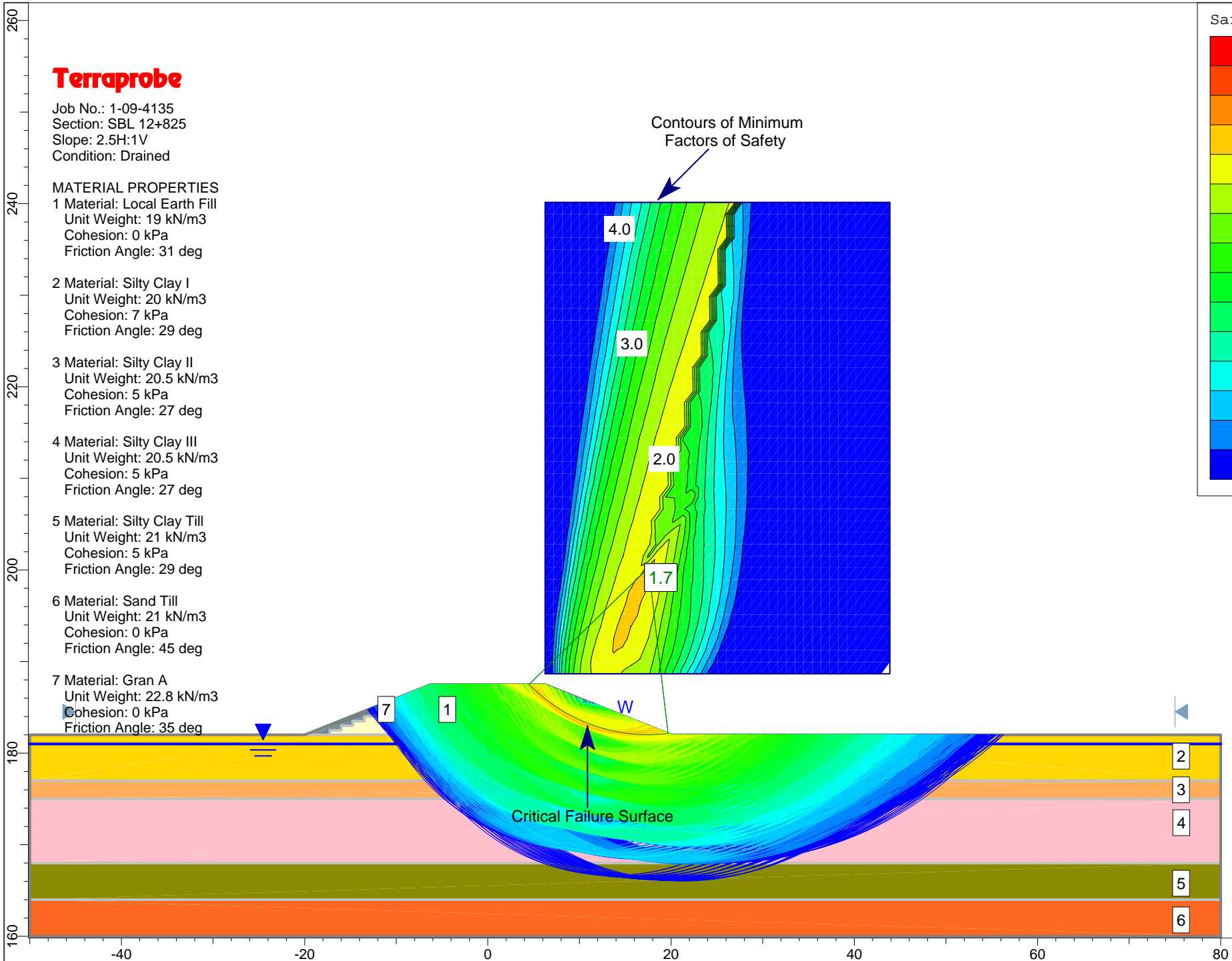
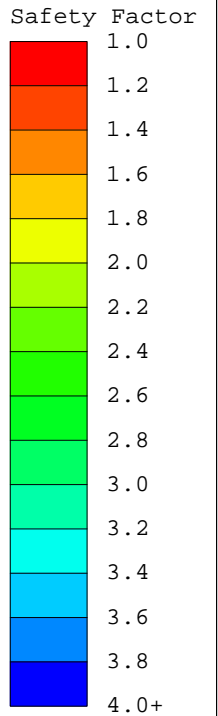
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+825
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg
- 7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

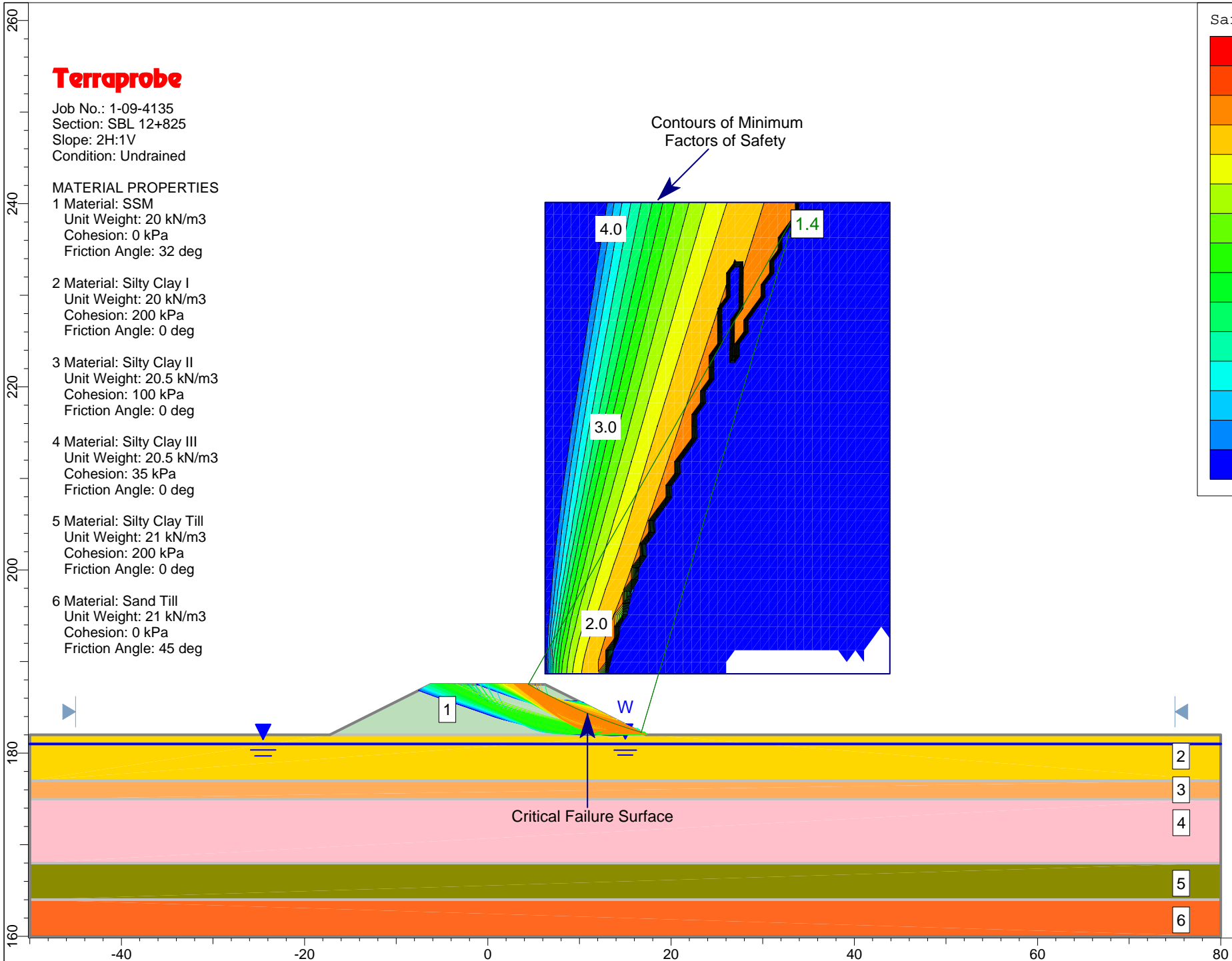
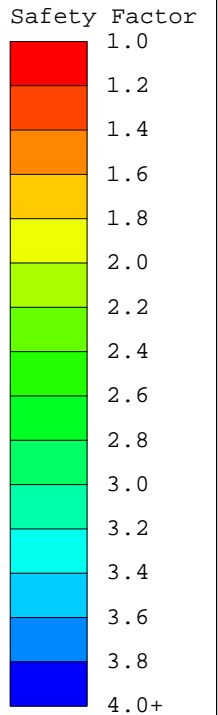
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+825
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 35 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

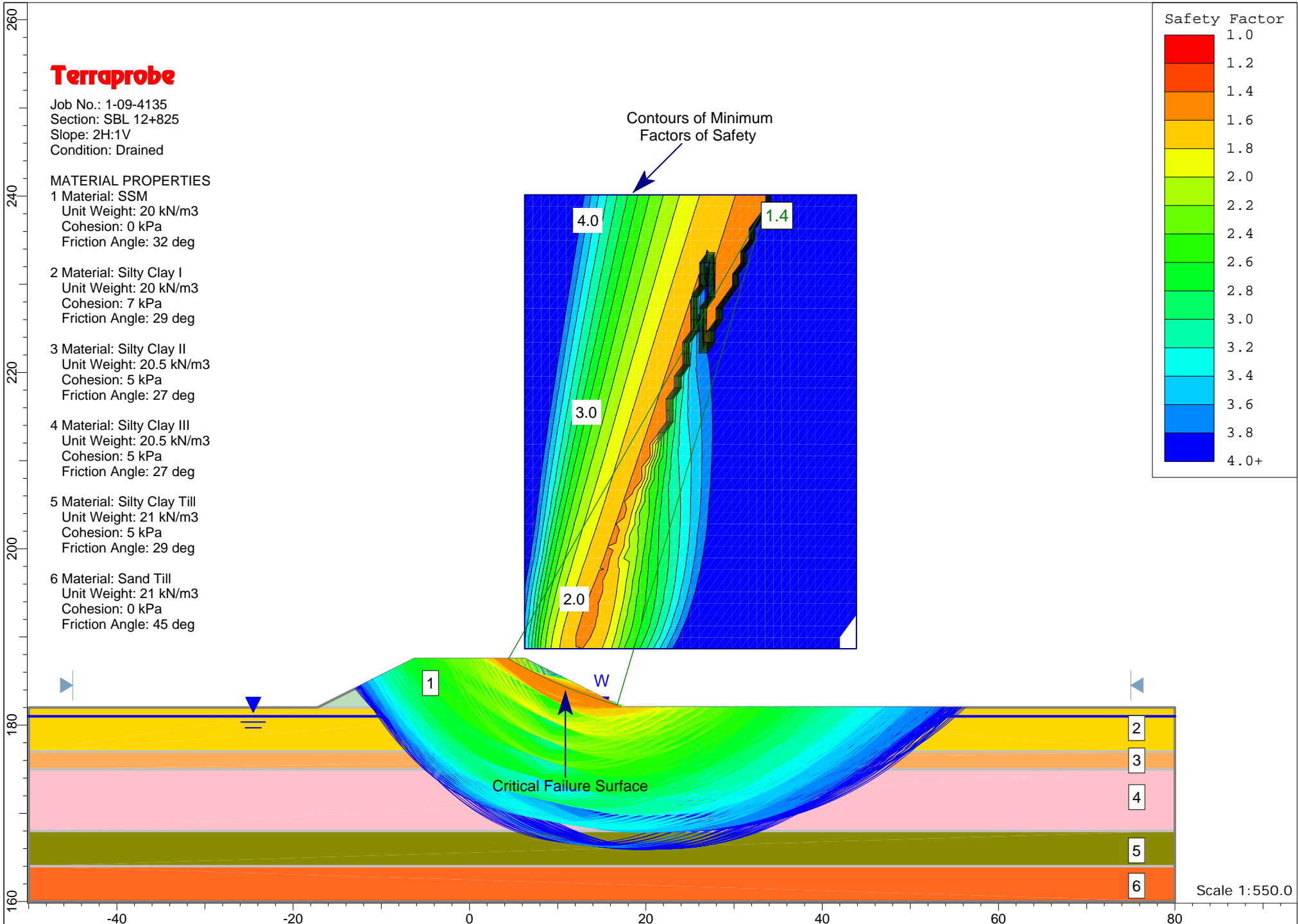
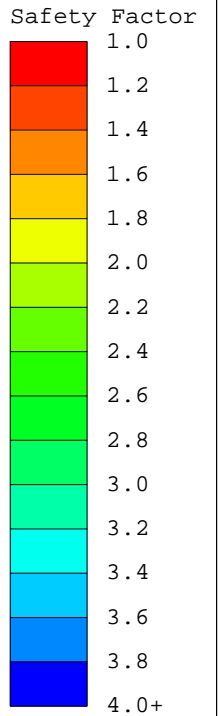
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+825
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



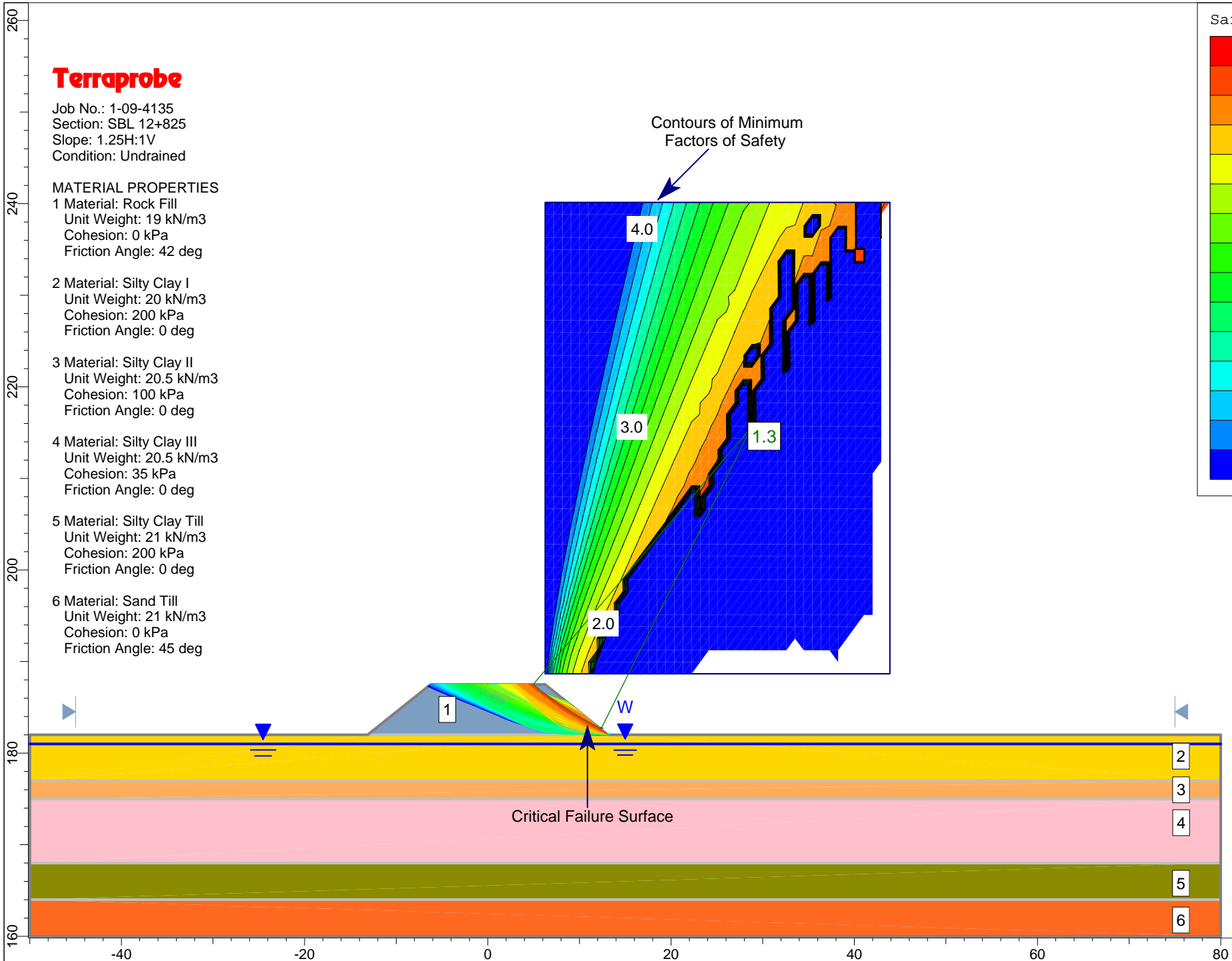
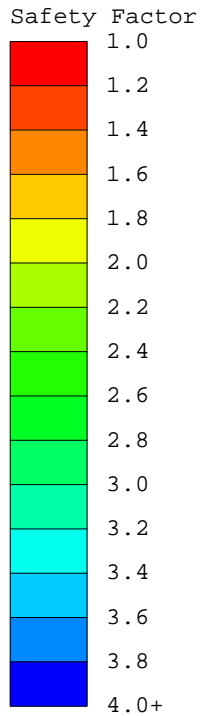
Terraprobe

Job No.: 1-09-4135
Section: SBL 12+825
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 35 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

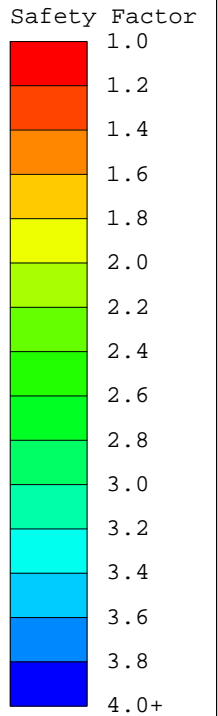


Terraprobe

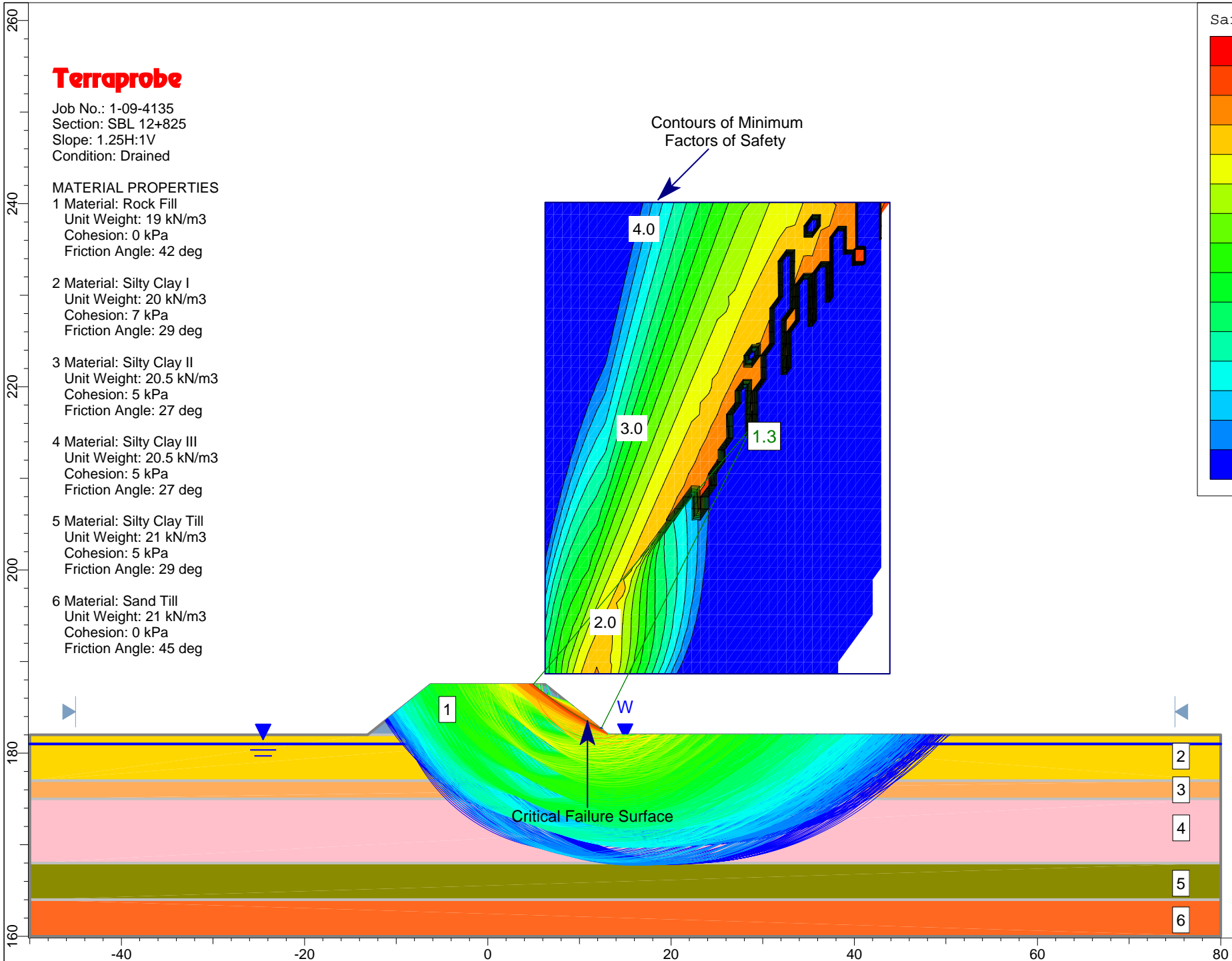
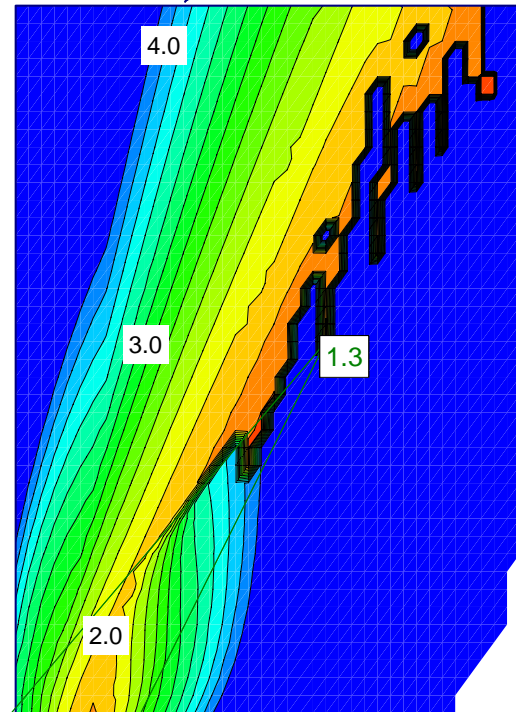
Job No.: 1-09-4135
Section: SBL 12+825
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum
Factors of Safety



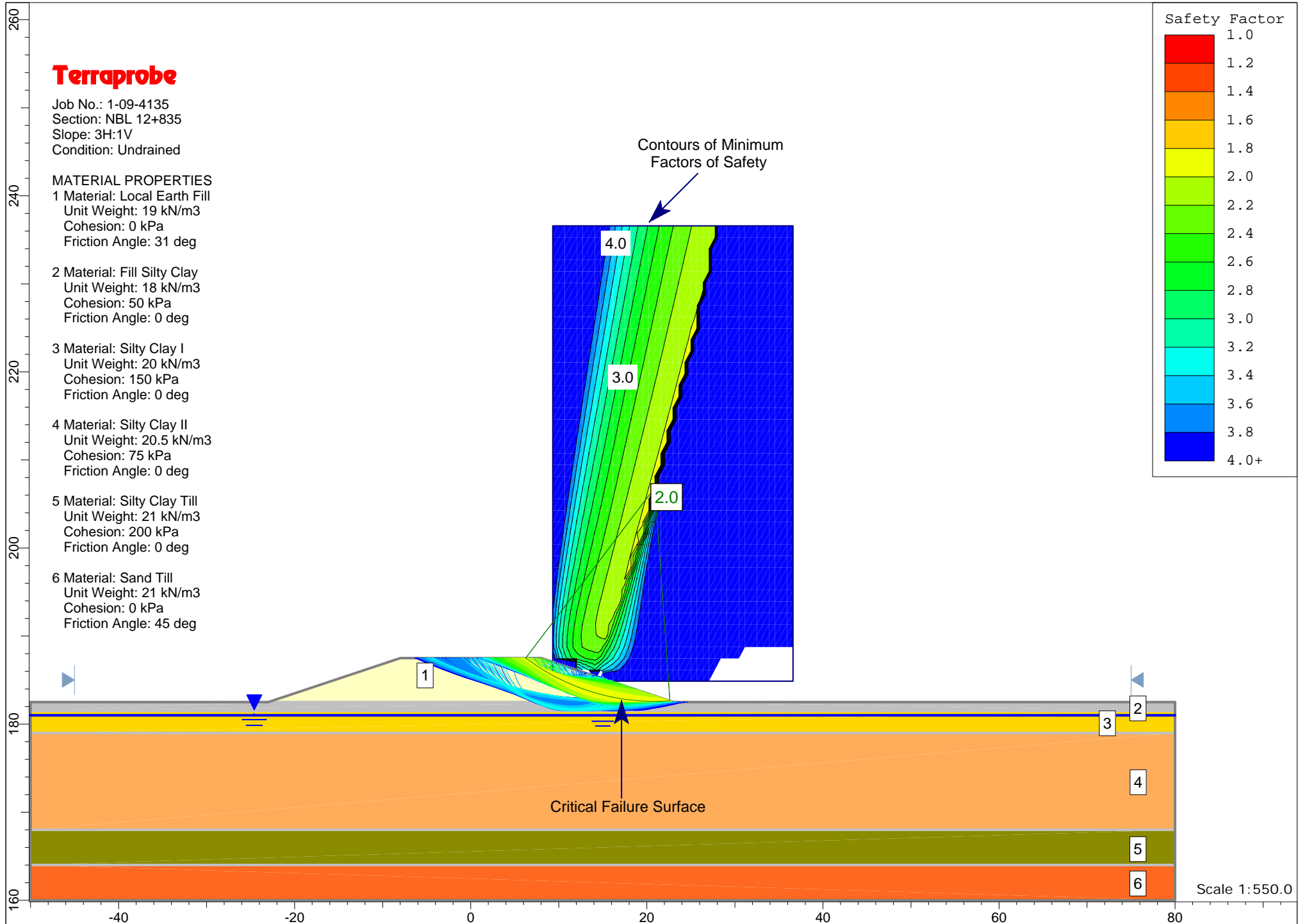
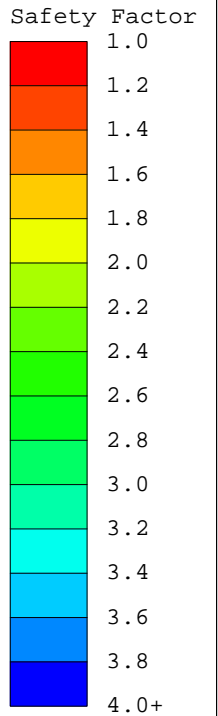
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+835
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 75 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

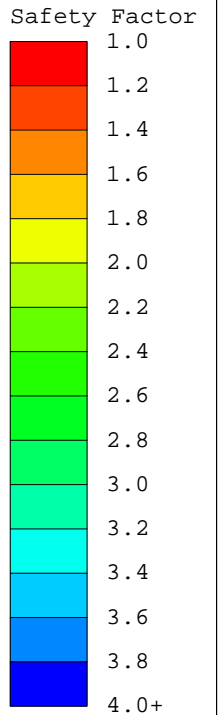


Terraprobe

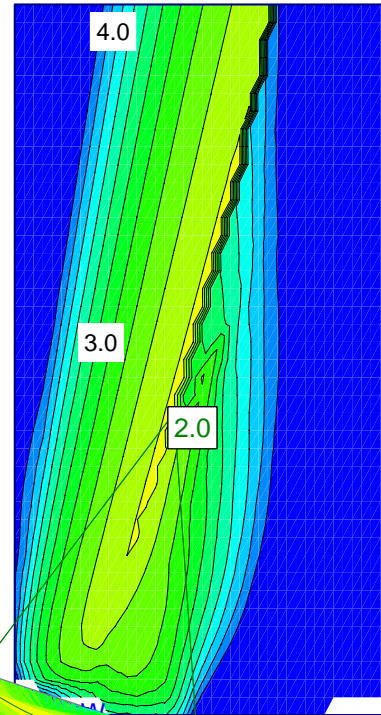
Job No.: 1-09-4135
Section: NBL 12+835
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Contours of Minimum Factors of Safety



Critical Failure Surface

Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: NBL 12+835
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg

4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 75 kPa
Friction Angle: 0 deg

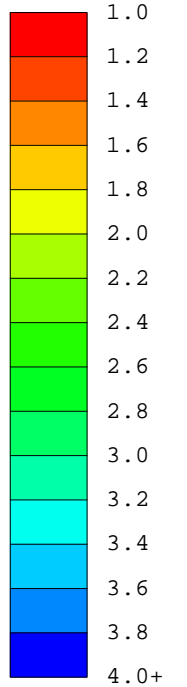
5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Critical Failure Surface

Scale 1:550.0

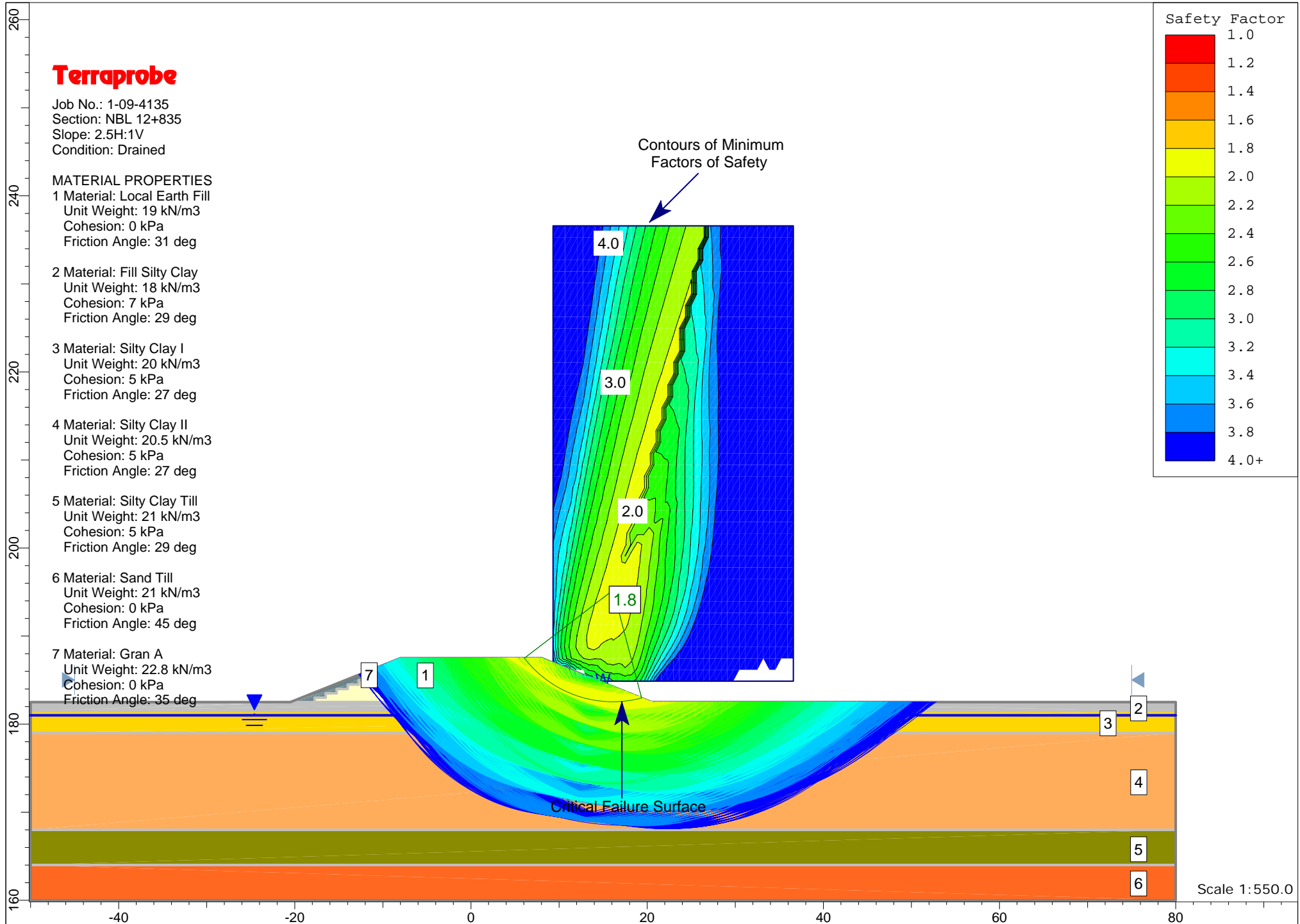
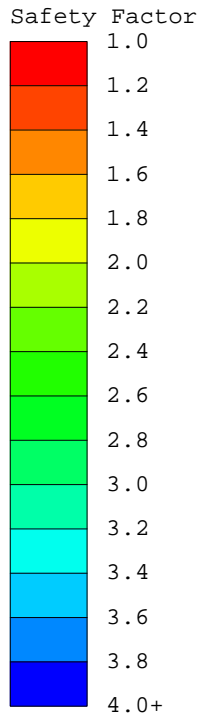
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+835
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg
- 7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety



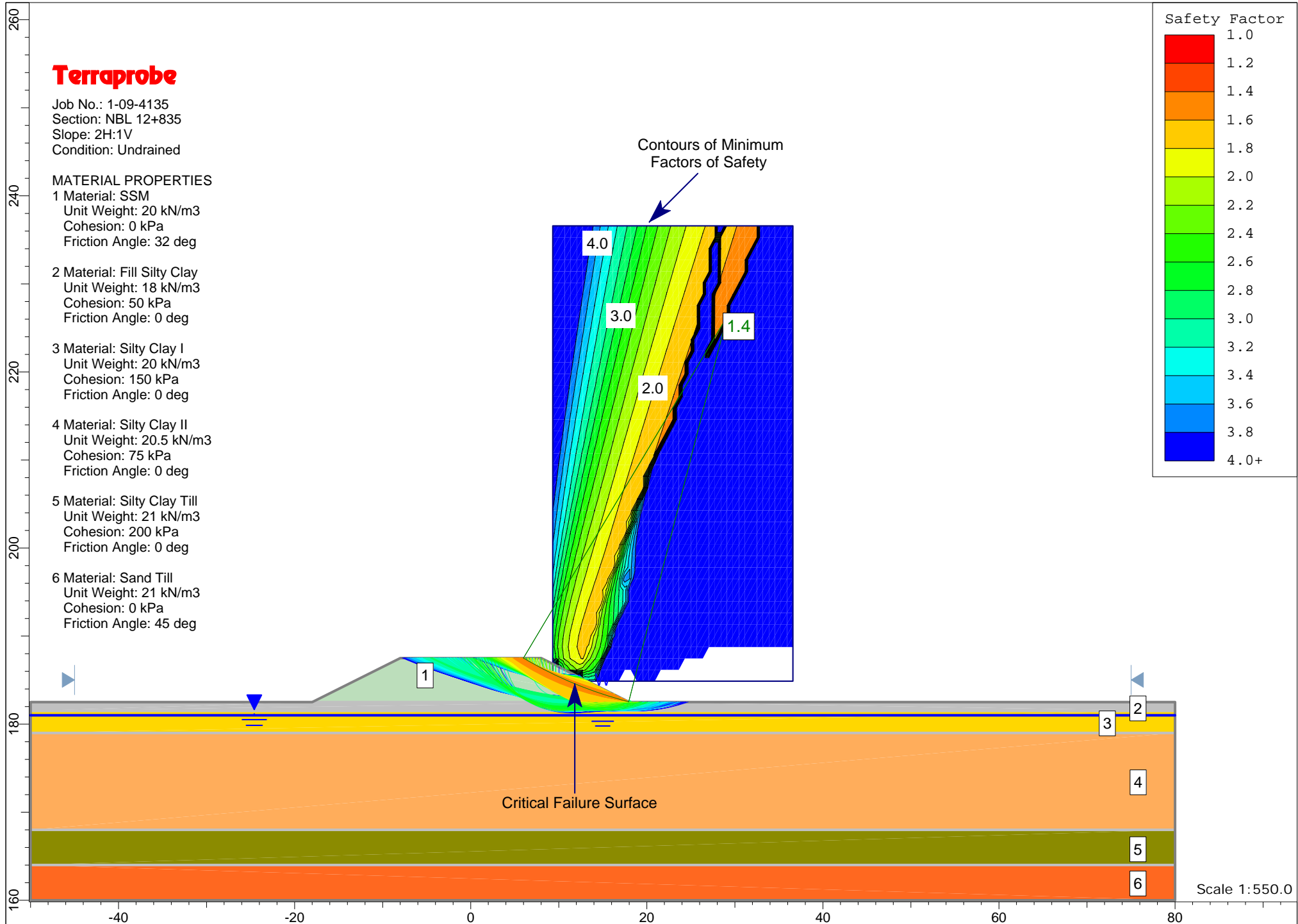
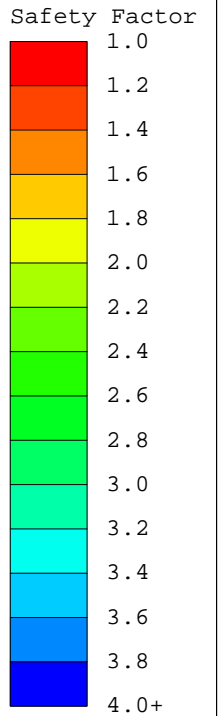
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+835
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 75 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



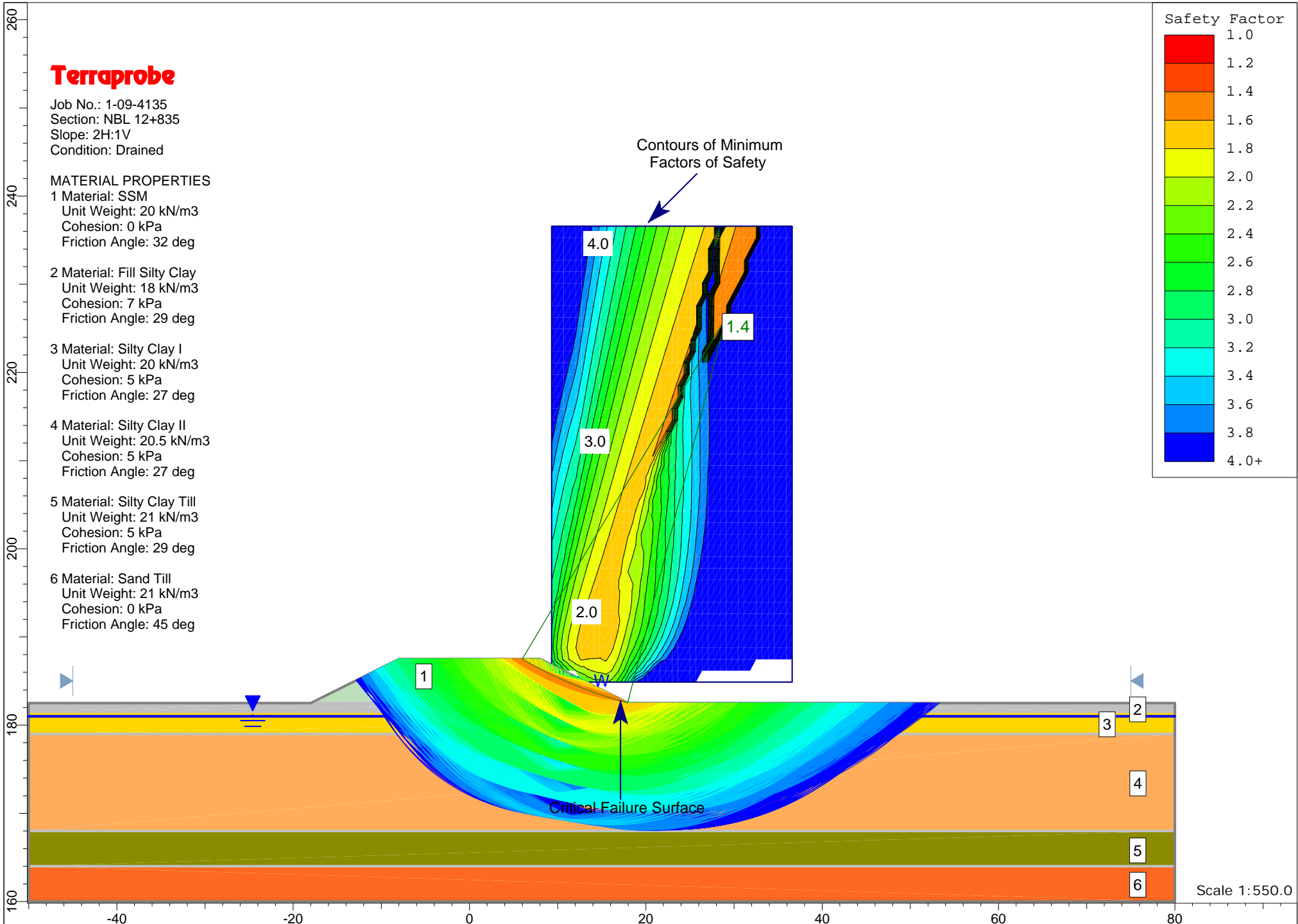
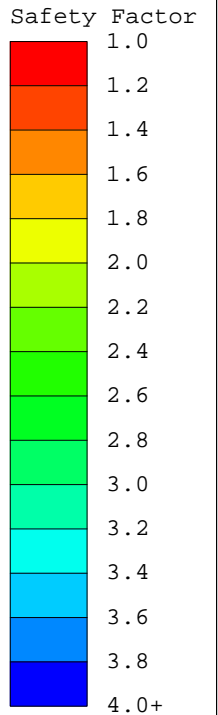
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+835
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



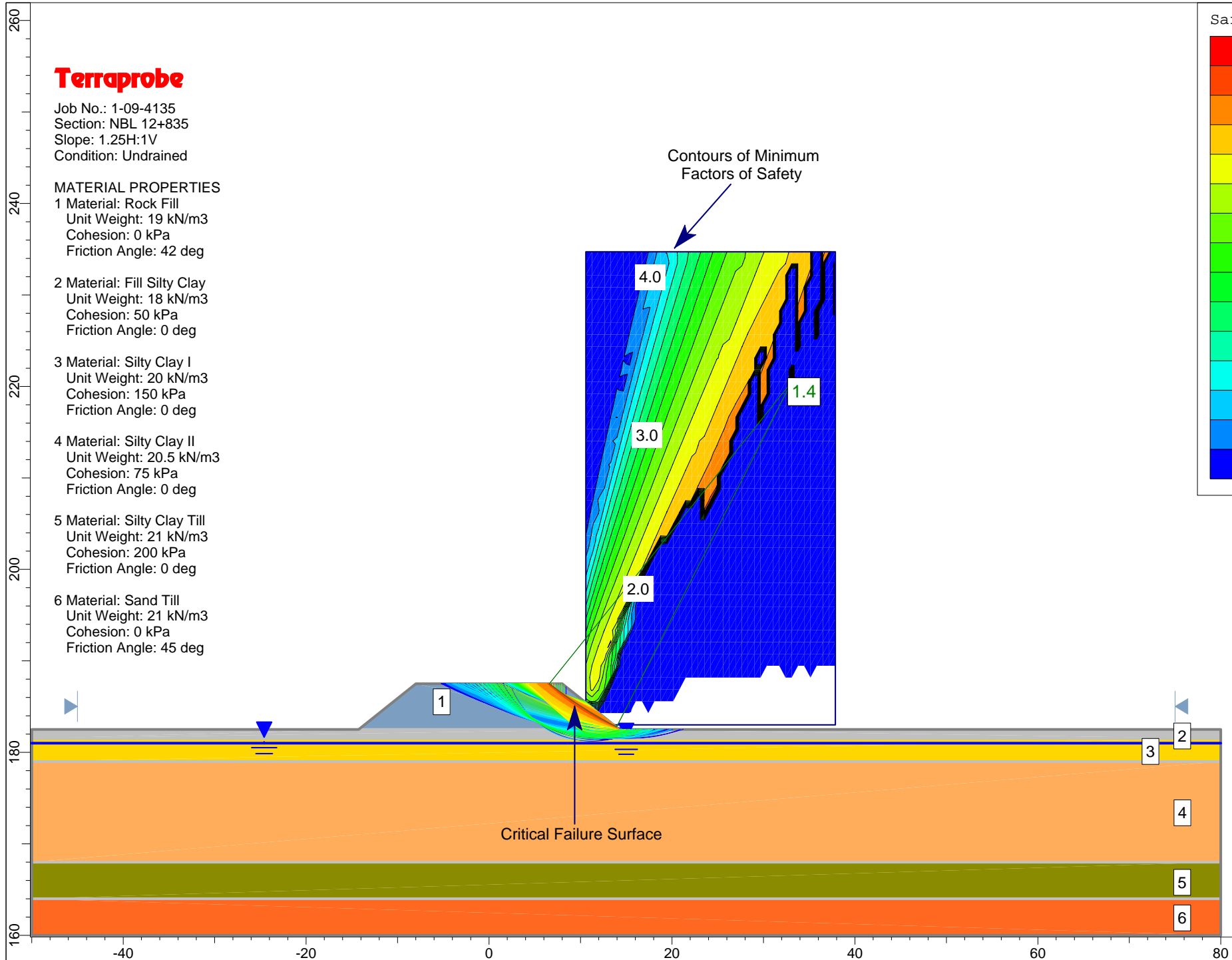
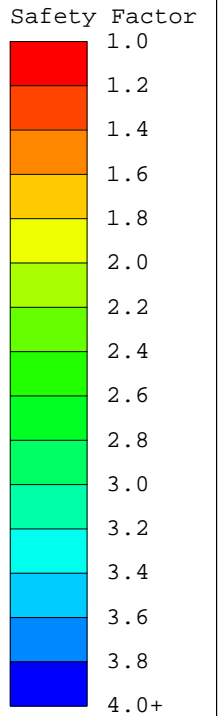
Terraprobe

Job No.: 1-09-4135
Section: NBL 12+835
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 150 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 75 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

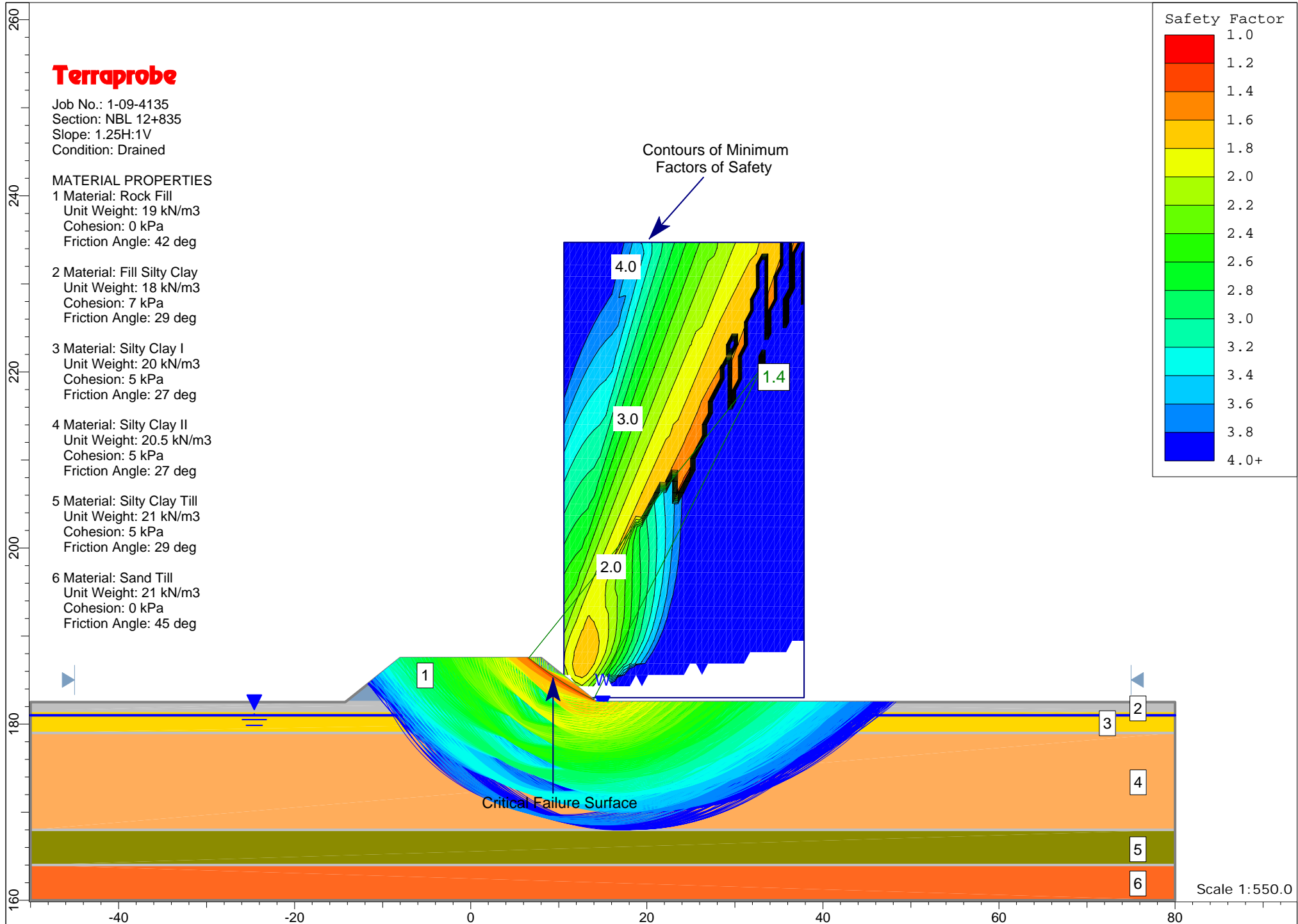
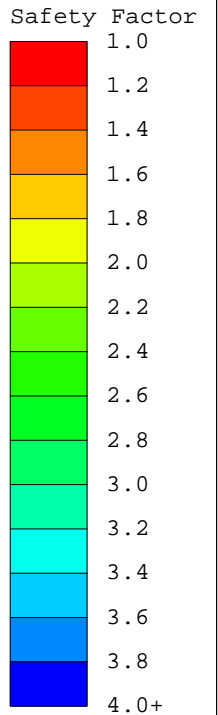


Terraprobe

Job No.: 1-09-4135
Section: NBL 12+835
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Fill Silty Clay
Unit Weight: 18 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg



Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+900
Slope: 3H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

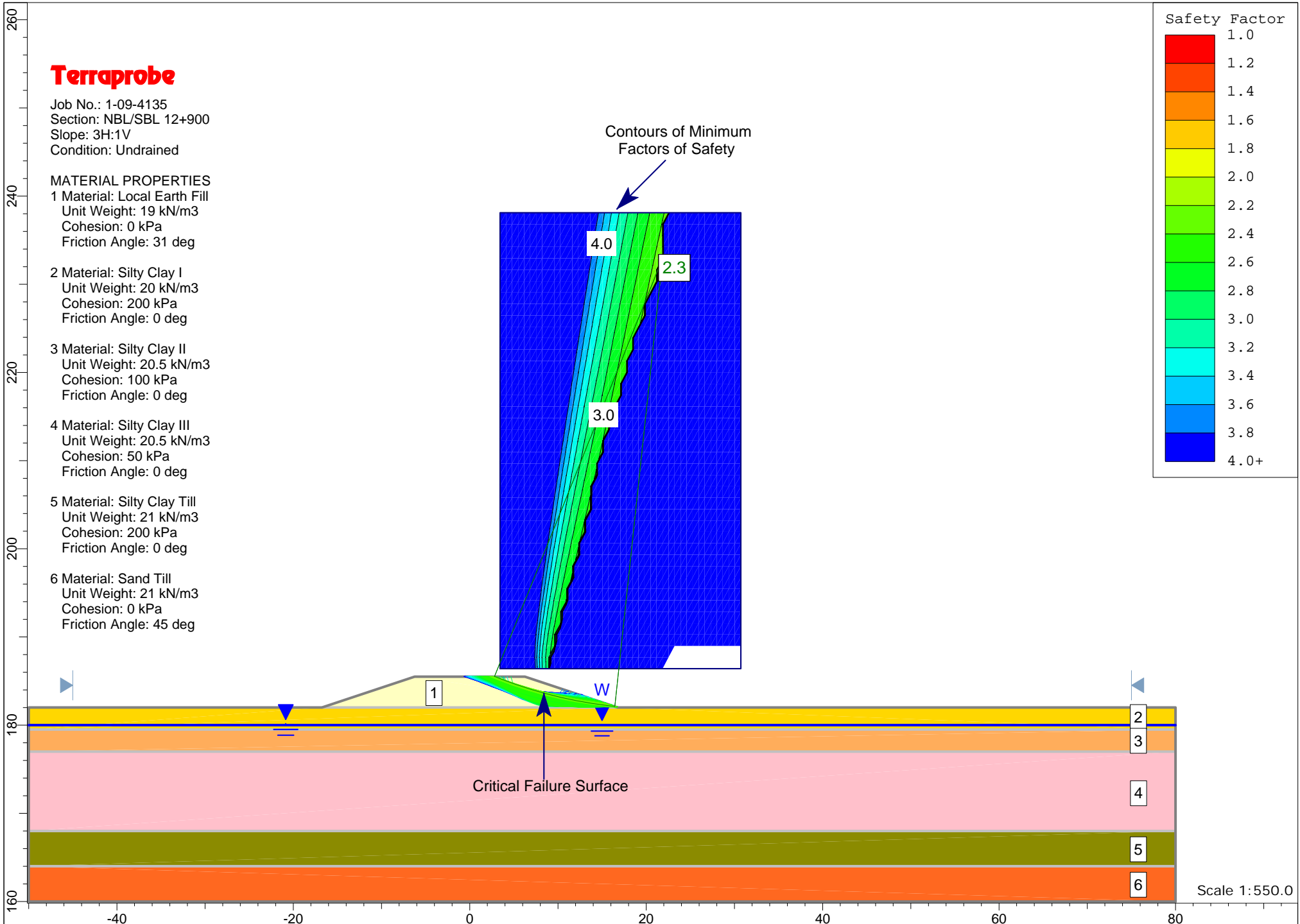
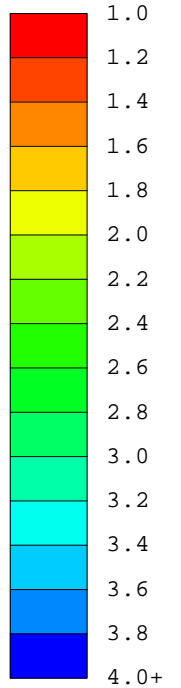
4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

Safety Factor



Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+900
Slope: 3H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

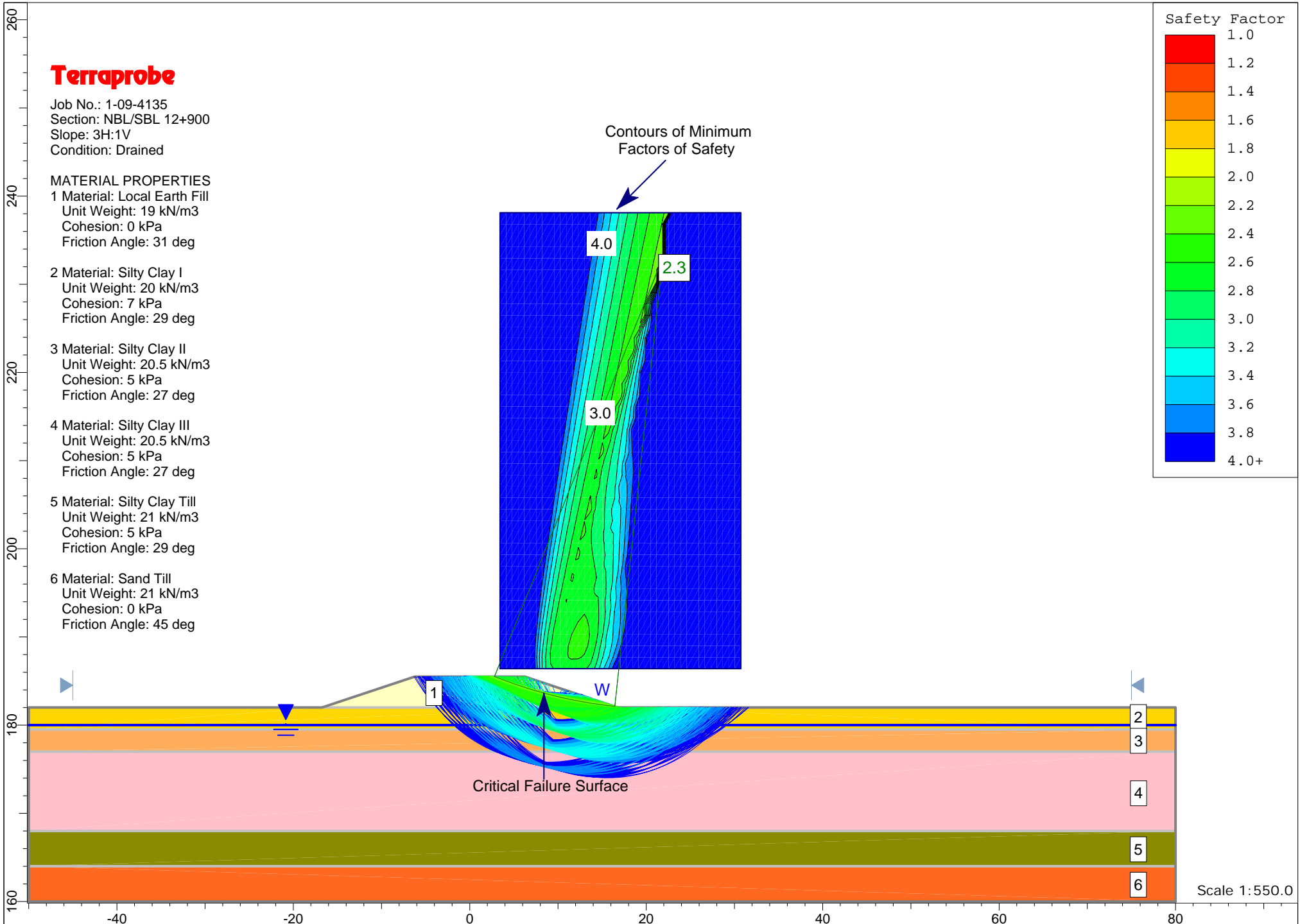
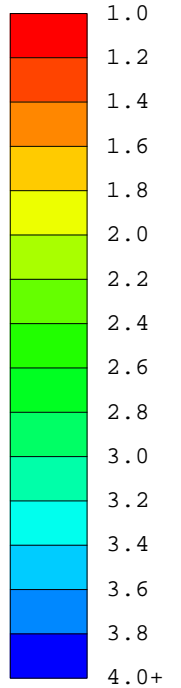
4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety

Safety Factor



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+900
Slope: 2.5H:1V
Condition: Undrained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg

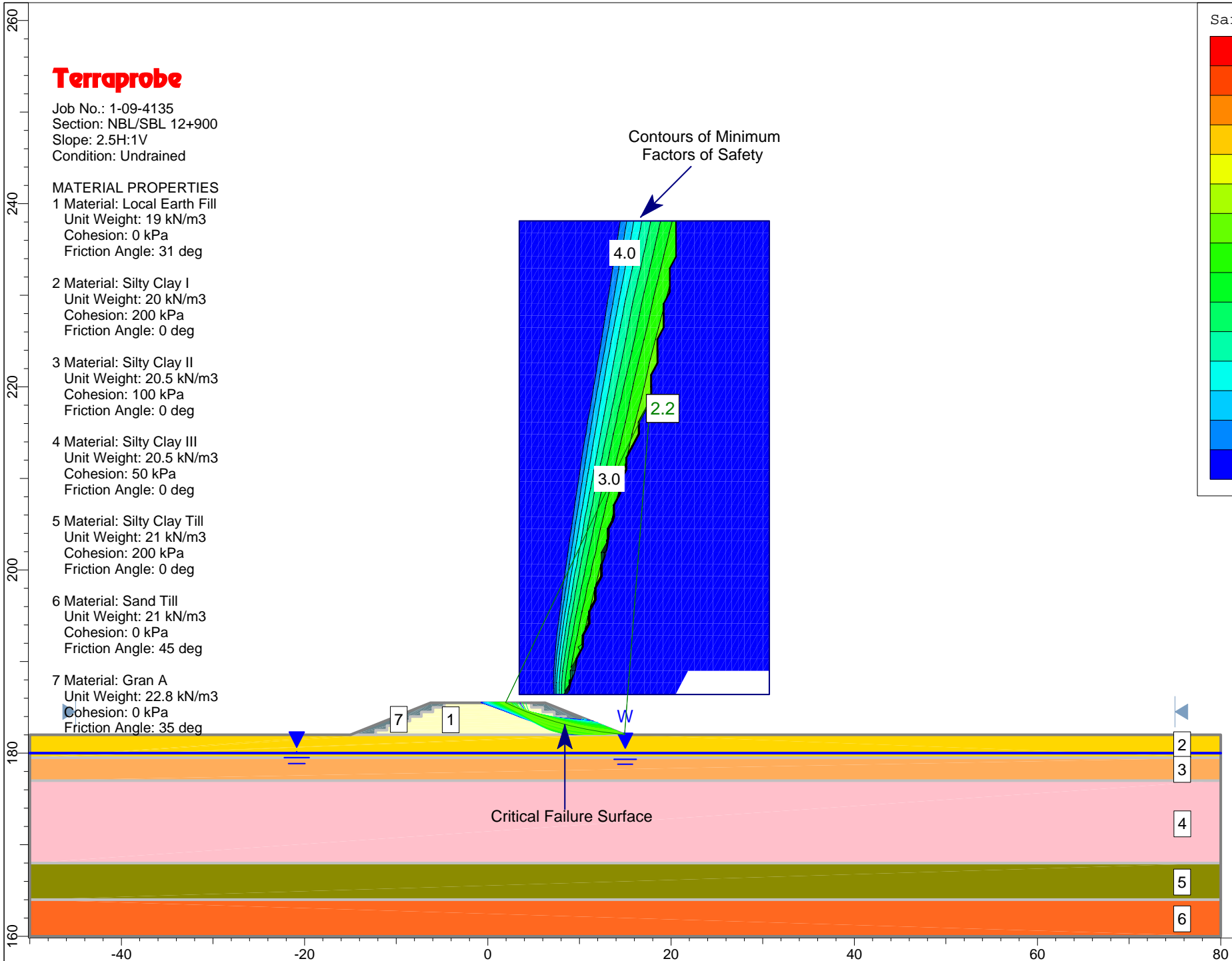
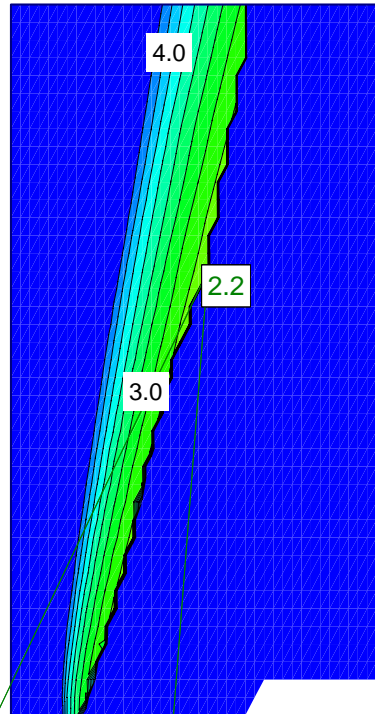
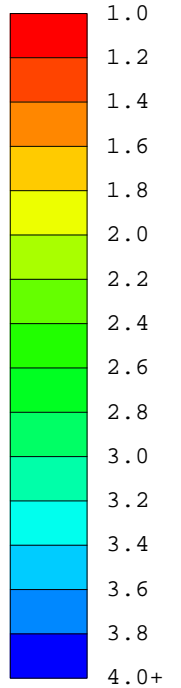
5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+900
Slope: 2.5H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Local Earth Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 31 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

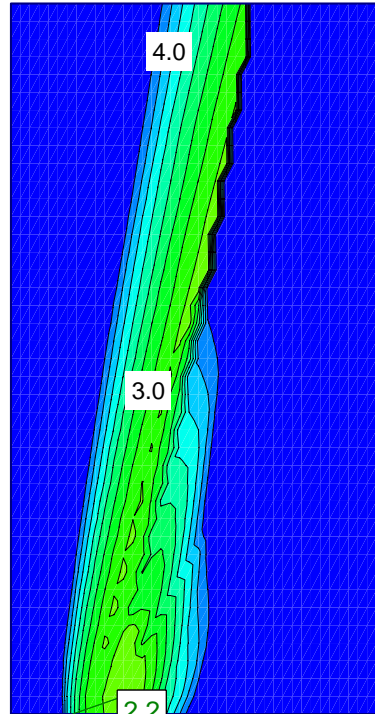
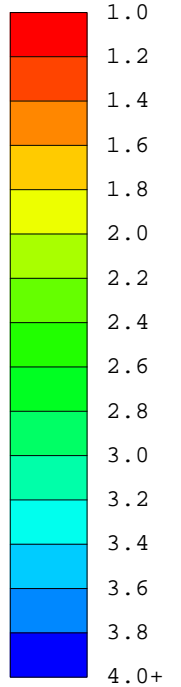
5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

7 Material: Gran A
Unit Weight: 22.8 kN/m³
Cohesion: 0 kPa
Friction Angle: 35 deg

Contours of Minimum
Factors of Safety

Safety Factor



Critical Failure Surface

Scale 1:550.0

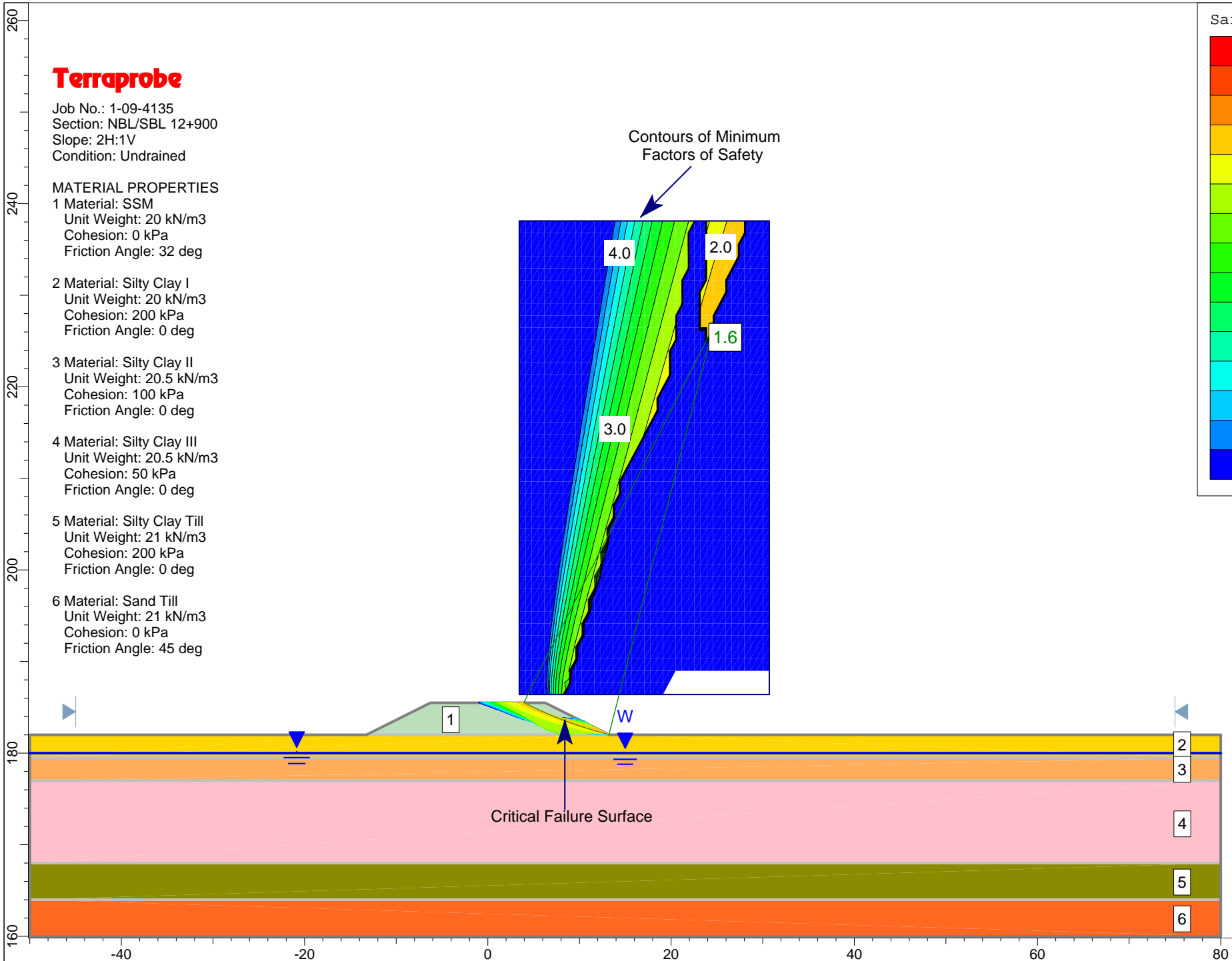
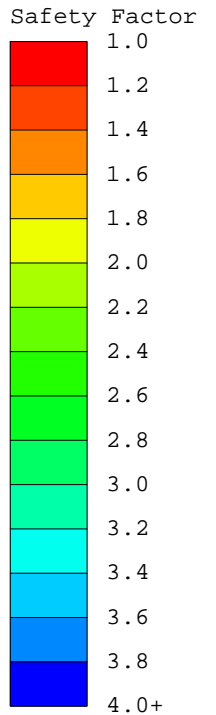
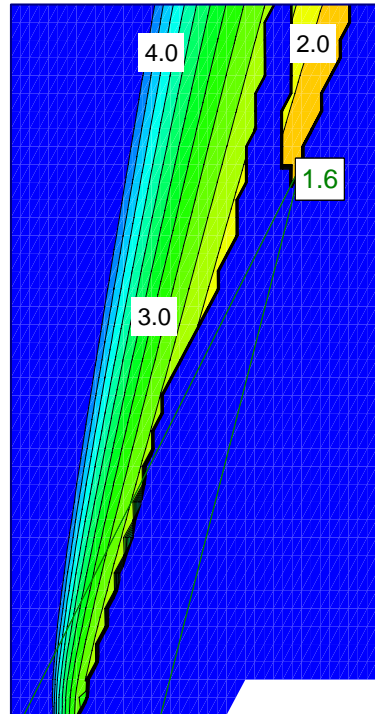
Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+900
Slope: 2H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

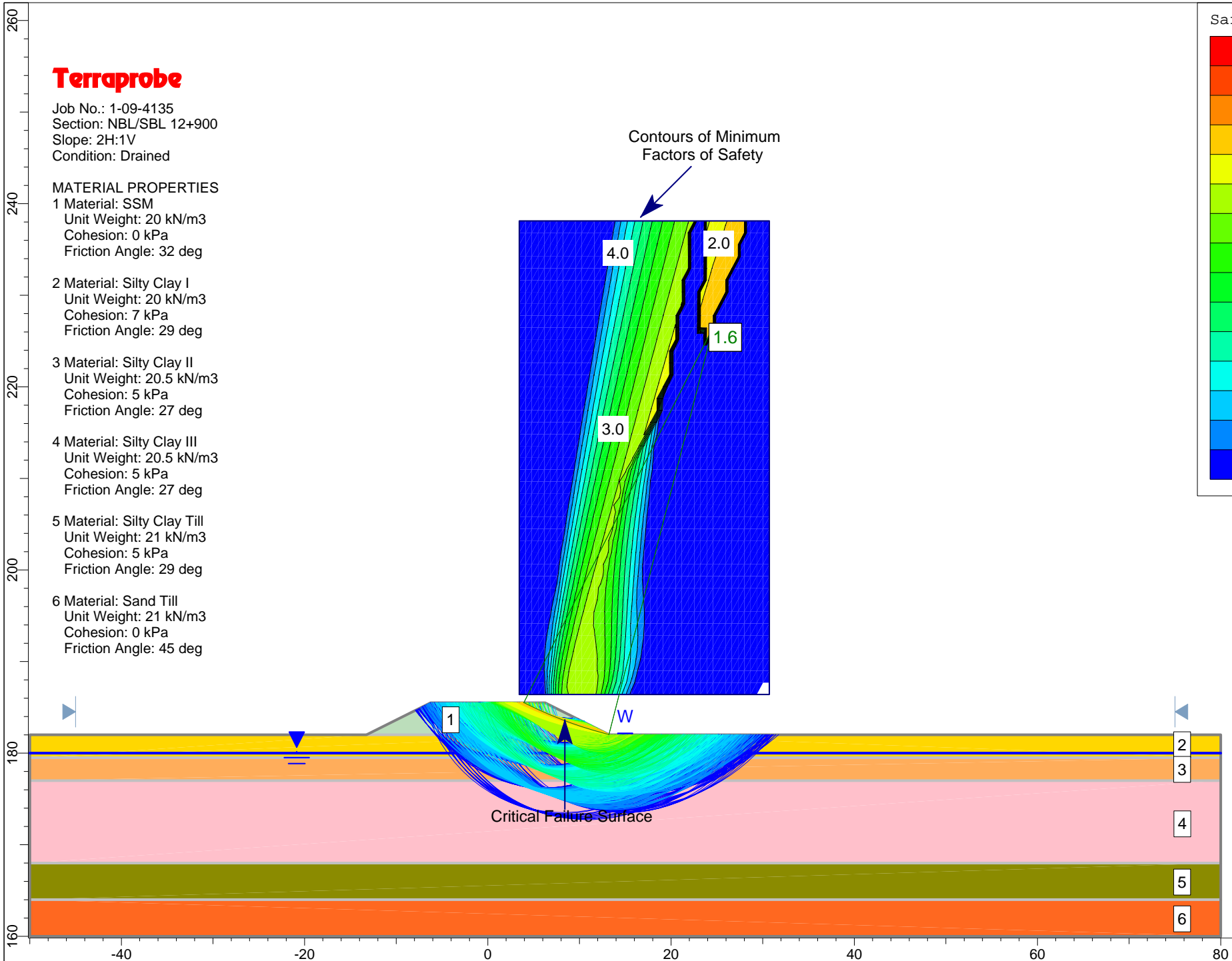
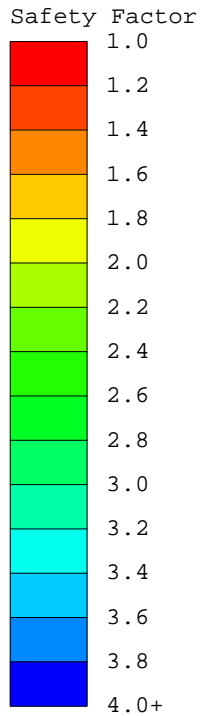
Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+900
Slope: 2H:1V
Condition: Drained

MATERIAL PROPERTIES

- 1 Material: SSM
Unit Weight: 20 kN/m³
Cohesion: 0 kPa
Friction Angle: 32 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



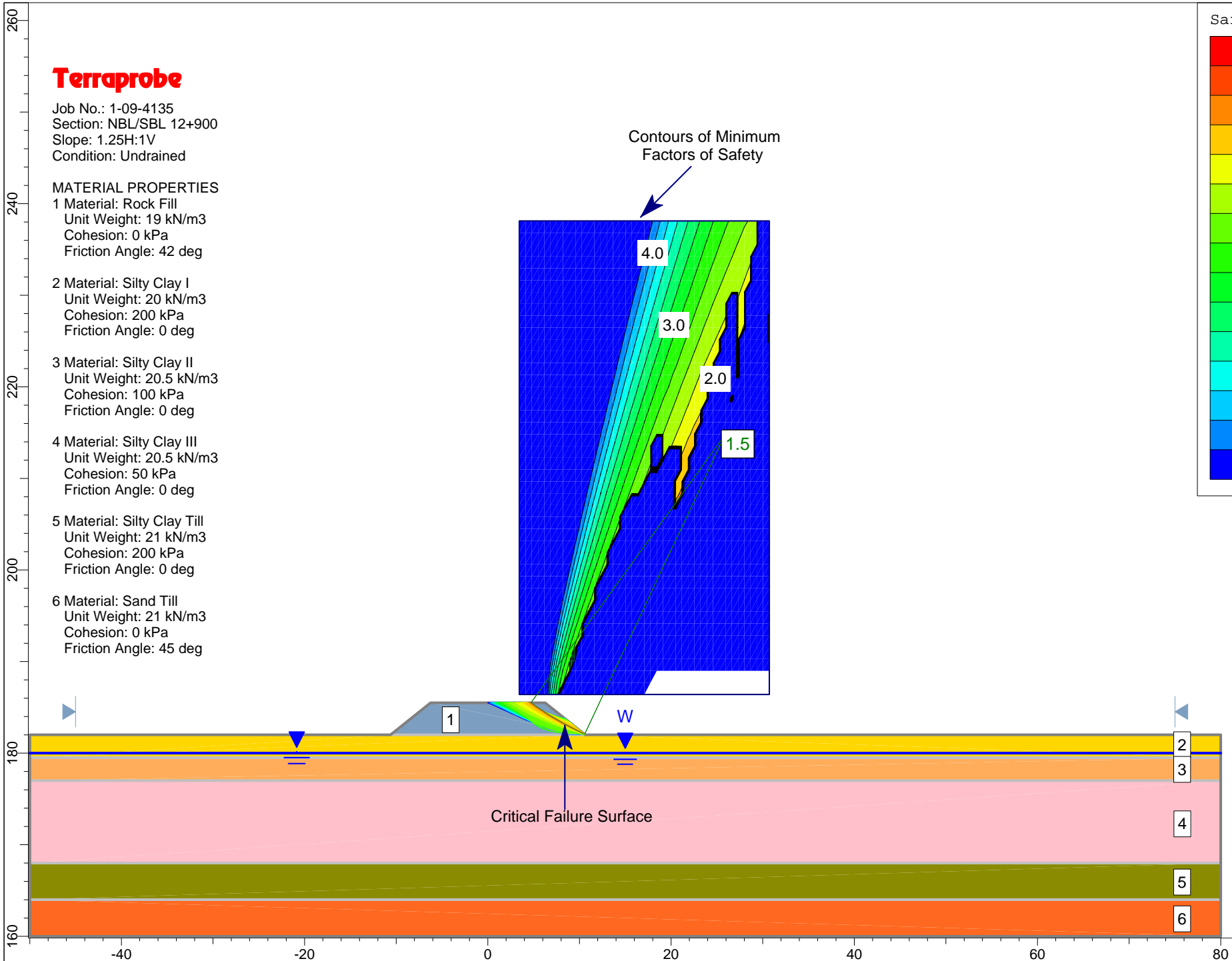
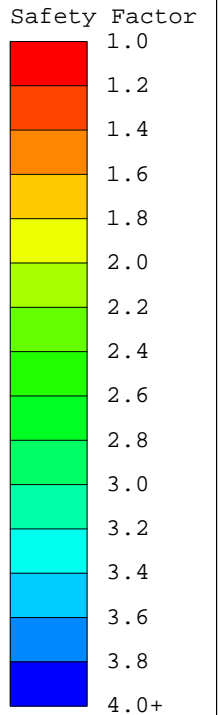
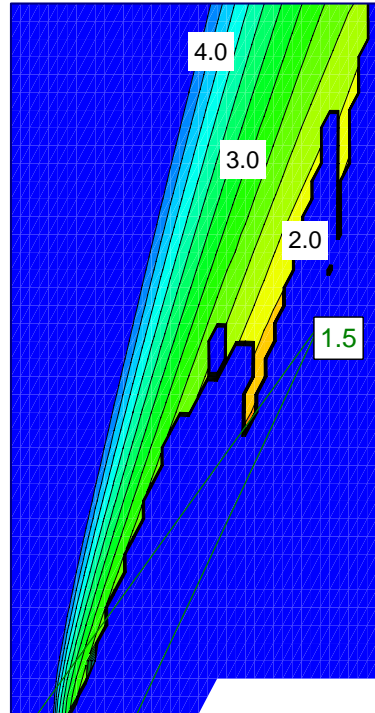
Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+900
Slope: 1.25H:1V
Condition: Undrained

MATERIAL PROPERTIES

- 1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg
- 2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 100 kPa
Friction Angle: 0 deg
- 4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 50 kPa
Friction Angle: 0 deg
- 5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 200 kPa
Friction Angle: 0 deg
- 6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

Contours of Minimum
Factors of Safety



Scale 1:550.0

Terraprobe

Job No.: 1-09-4135
Section: NBL/SBL 12+900
Slope: 1.25H:1V
Condition: Drained

MATERIAL PROPERTIES

1 Material: Rock Fill
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Friction Angle: 42 deg

2 Material: Silty Clay I
Unit Weight: 20 kN/m³
Cohesion: 7 kPa
Friction Angle: 29 deg

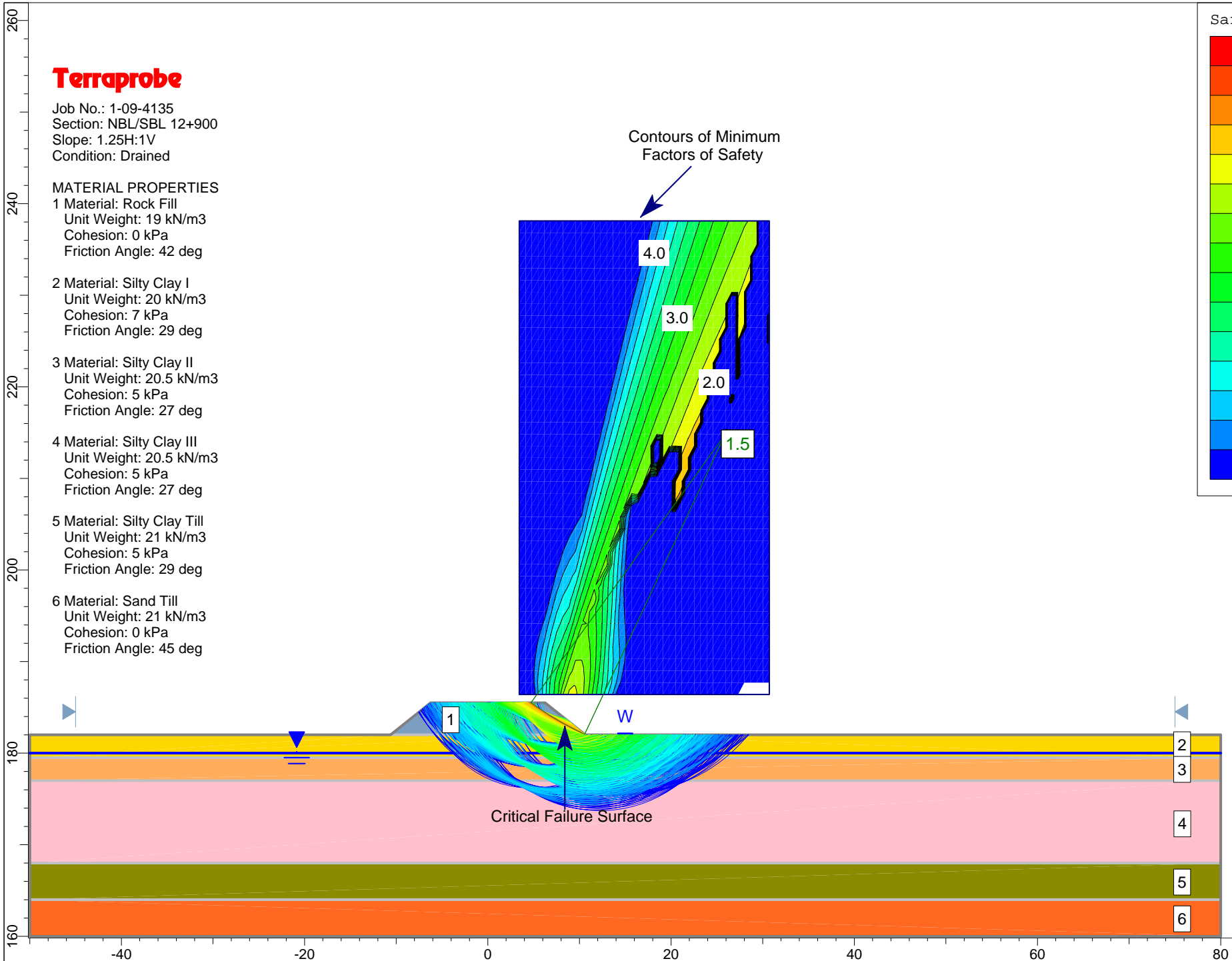
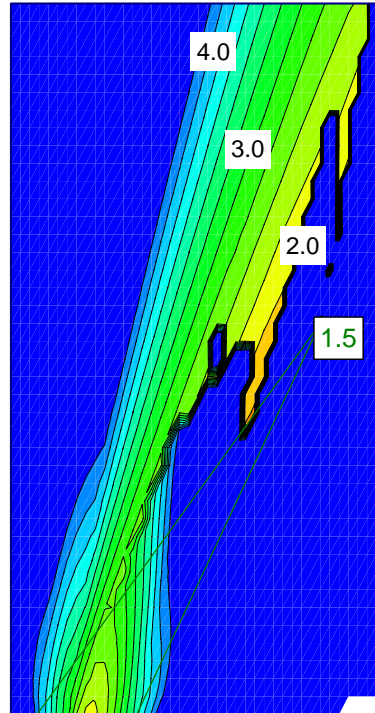
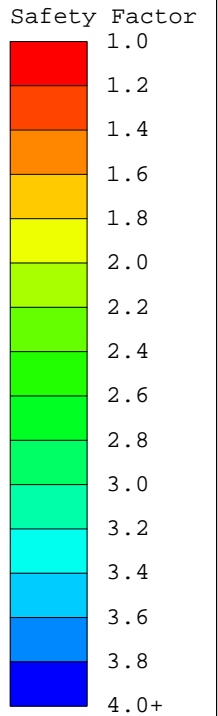
3 Material: Silty Clay II
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

4 Material: Silty Clay III
Unit Weight: 20.5 kN/m³
Cohesion: 5 kPa
Friction Angle: 27 deg

5 Material: Silty Clay Till
Unit Weight: 21 kN/m³
Cohesion: 5 kPa
Friction Angle: 29 deg

6 Material: Sand Till
Unit Weight: 21 kN/m³
Cohesion: 0 kPa
Friction Angle: 45 deg

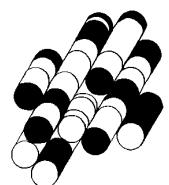
Contours of Minimum
Factors of Safety



Scale 1:550.0

APPENDIX E

TERRAPROBE INC.



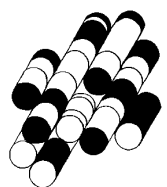
COMPARISON OF EMBANKMENT ALTERNATIVES

Local Earth Borrow	Composite Embankment	SSM Embankment	Rock Fill Embankment
<p>Advantages:</p> <ul style="list-style-type: none"> i. Material readily available and less costly to import. ii. Easy to place and compact. <p>Disadvantages:</p> <ul style="list-style-type: none"> i. Requires relatively flat 3H:1V side slopes because of known performance related issues with cohesive fill. ii. Requires a larger embankment footprint that may conflict with adjacent highway elements. iii. Must be instrumented and monitored until consolidation settlement is complete. 	<p>Advantages:</p> <ul style="list-style-type: none"> i. Can be constructed at steeper side slopes compared to local earth borrow. ii. Smaller embankment footprint than local earth borrow. <p>Disadvantages:</p> <ul style="list-style-type: none"> i. Relatively high construction effort required i.e. benching and placement of dissimilar materials. ii. More costly than using local earth borrow. iii. Little MTO case history on performance. iv. Must be instrumented and monitored until consolidation settlement is complete 	<p>Advantages:</p> <ul style="list-style-type: none"> i. Can be constructed at conventional 2H:1V slopes. ii. Conventional embankment footprint. iii. Proven reliable performance on MTO projects. <p>Disadvantages:</p> <ul style="list-style-type: none"> i. More costly than earth borrow. ii. Requires stringent quality control to ensure that only approved material is selected and used. iii. Must be instrumented and monitored until consolidation settlement is complete 	<p>Advantages:</p> <ul style="list-style-type: none"> i. Can be constructed at 1.25H:1V slopes. ii. Small embankment footprint. iii. Proven reliable performance on MTO projects. <p>Disadvantages:</p> <ul style="list-style-type: none"> i. Material may not be readily available compared to local earth borrow. ii. Must be instrumented and monitored until consolidation settlement is complete
<p>Risks/Consequences</p> <ul style="list-style-type: none"> i. Low risk of future stability issues and less costly preventative maintenance provided 3H:1V slopes are used. ii. Larger footprint area may conflict with adjacent highway elements. 	<p>Risks/Consequences</p> <ul style="list-style-type: none"> i. Low risk of shallow failures. ii. No documented MTO case history on performance. iii. Large footprint area may conflict with adjacent highway elements. 	<p>Risks/Consequences</p> <ul style="list-style-type: none"> i. Very low risk of failure. ii. Relatively higher material cost. 	<p>Risks/Consequences</p> <ul style="list-style-type: none"> i. Very low risk of failure. ii. Higher construction effort required to widen embankment in the future.
APPROXIMATE COSTS			
\$ 7.65 per cubic metre	\$ 46.00 per cubic metre	\$ 23.00 per cubic metre	\$29.00 per cubic metre



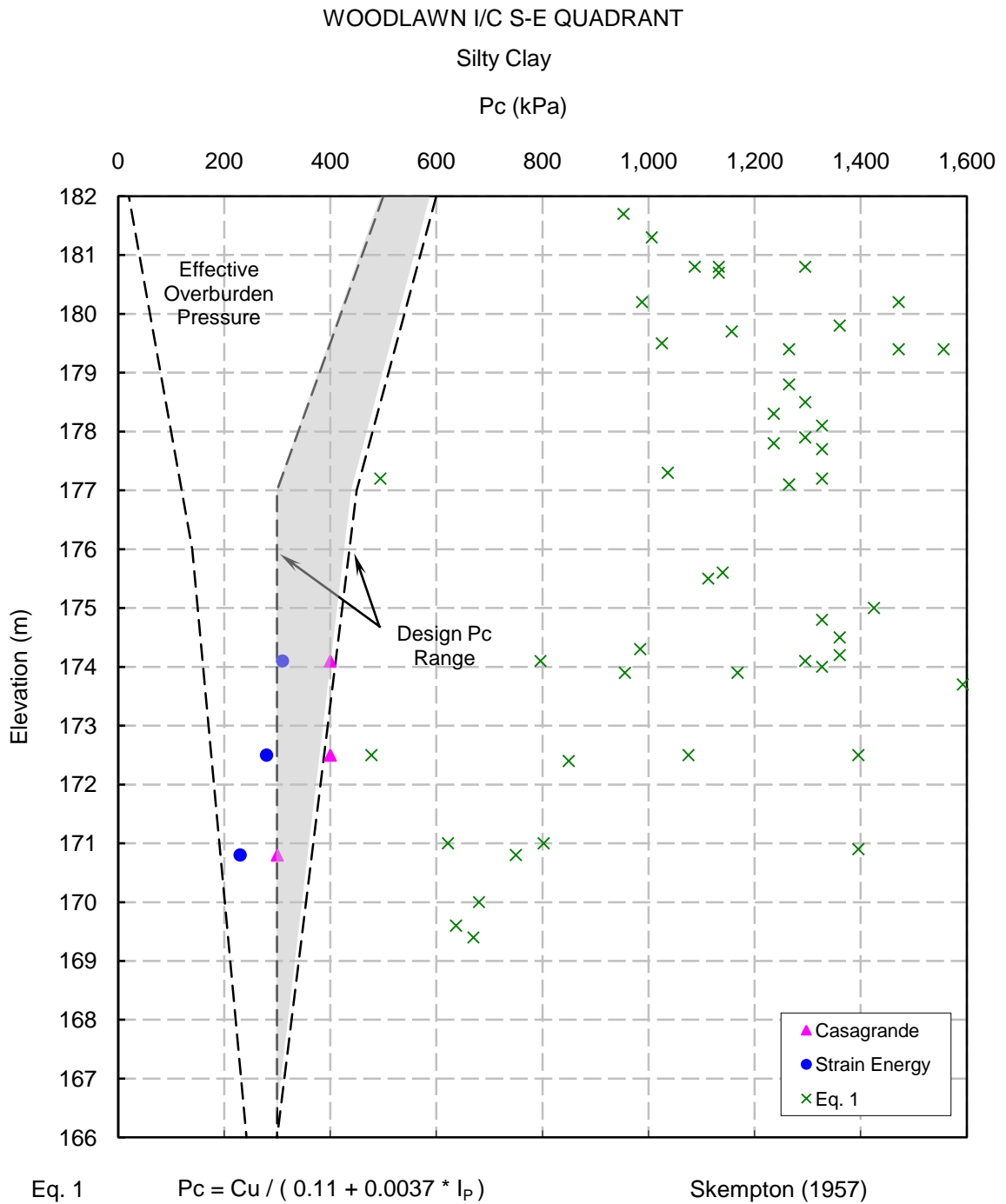
APPENDIX F

TERRAPROBE INC.



PREDICTED AND MEASURED PRECONSOLIDATION STRESS

FIGURE F2-1



Project No. : 1-09-4135

Date : September, 2010



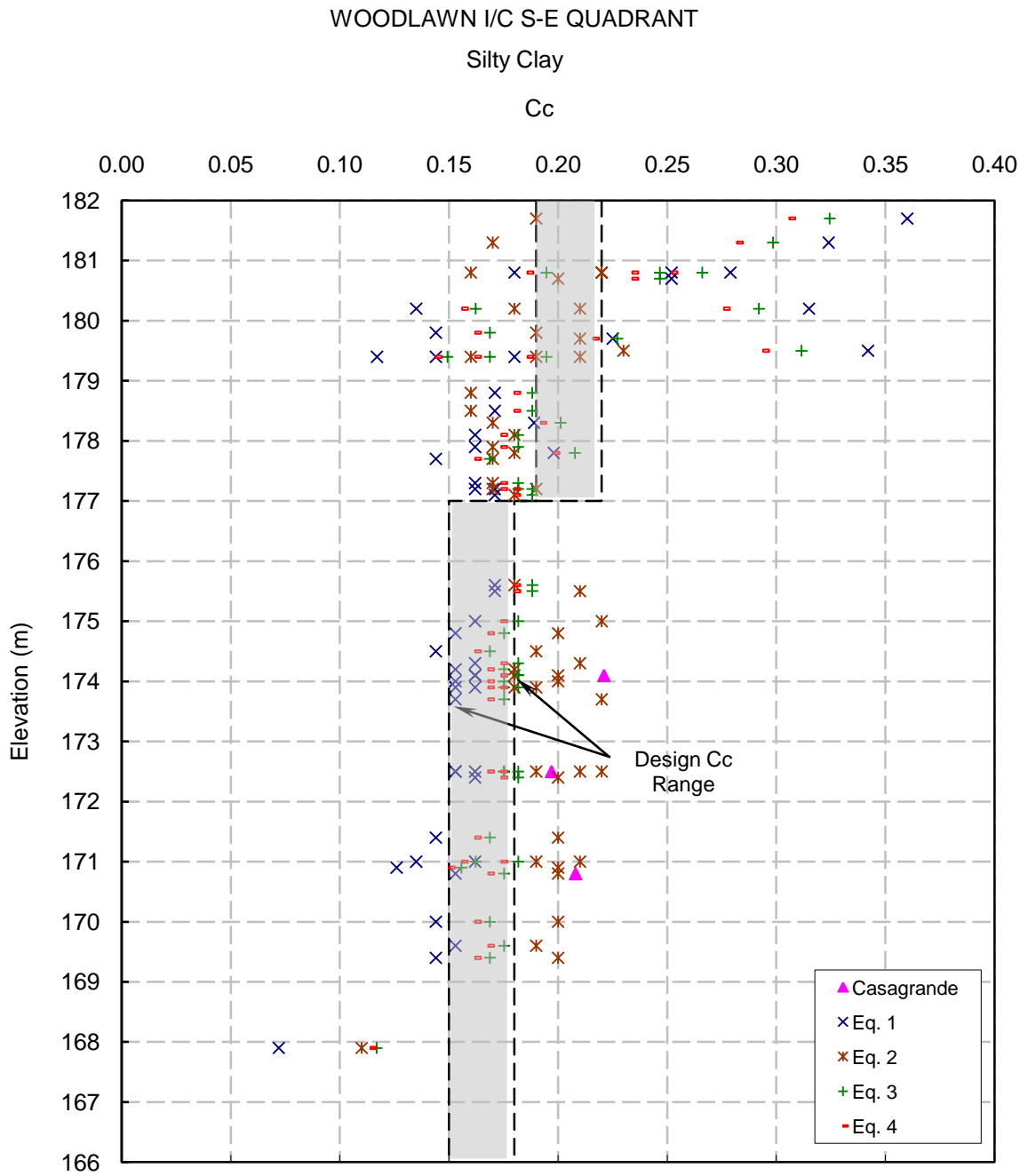
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED COMPRESSION INDEX

FIGURE F2-2



Eq. 1 $Cc = 0.009 * (LL - 10)$

Terzaghi & Peck (1967)

Eq. 2 $Cc = 0.01 * \omega$

Osterberg (1972)

Eq. 3 $Cc = 0.002343 * LL * Gs$

Nagaraj & Murty (1985)

Eq. 4 $Cc = 0.006 * (LL + 1)$

Lav & Ansal (2001)

Project No. : 1-09-4135

Date : September, 2010



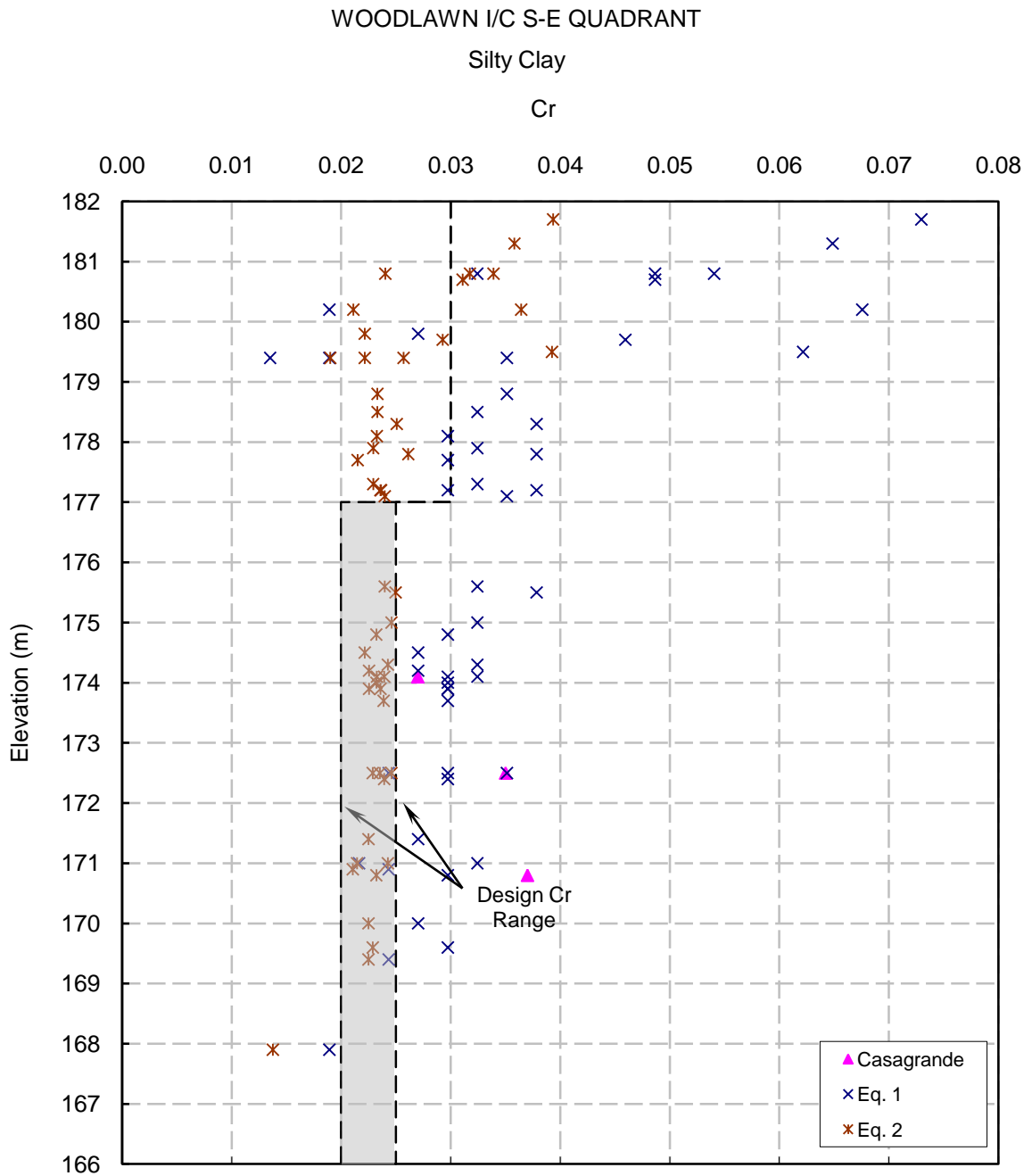
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED RECOMPRESSION INDEX

FIGURE F2-3



Eq. 1 $Cr = Ip / 370$

Kulhawy & Mayne (1990)

Eq. 2 $Cr = Cc / 5 \sim Cc / 10$

Das (1993)

Project No. : 1-09-4135

Date : September, 2010

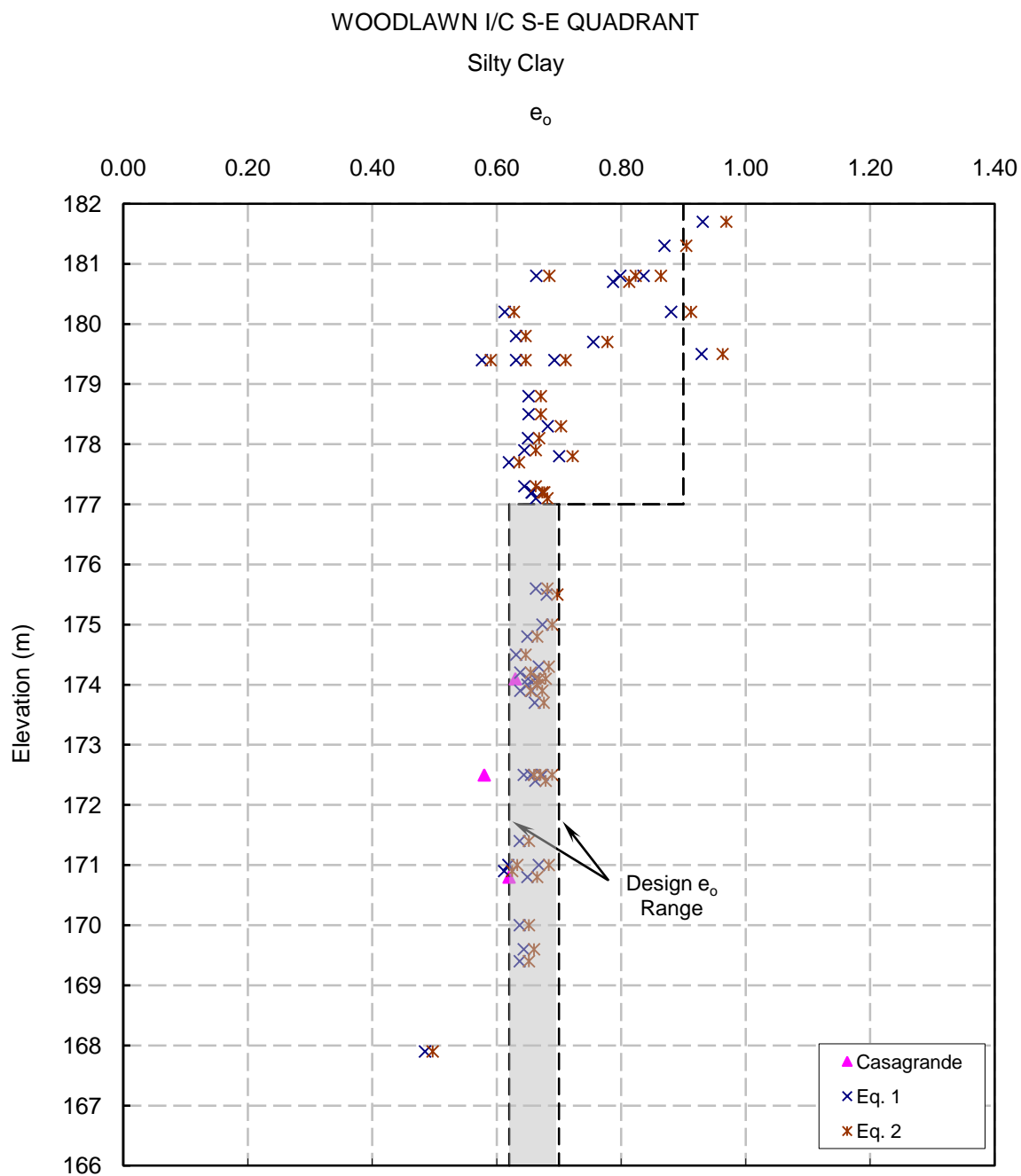


Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED VOID RATIO

FIGURE F2-4



Eq. 1 $e_o = (Cc - 0.256) / 0.43 + 0.84$

derived from Cozzolino (1961)

Eq. 2 $e_o = Cc / 0.40 - 0.001 * \omega + 0.25$

derived from Azzouz et al. (1976)

Project No. : 1-09-4135

Date : September, 2010



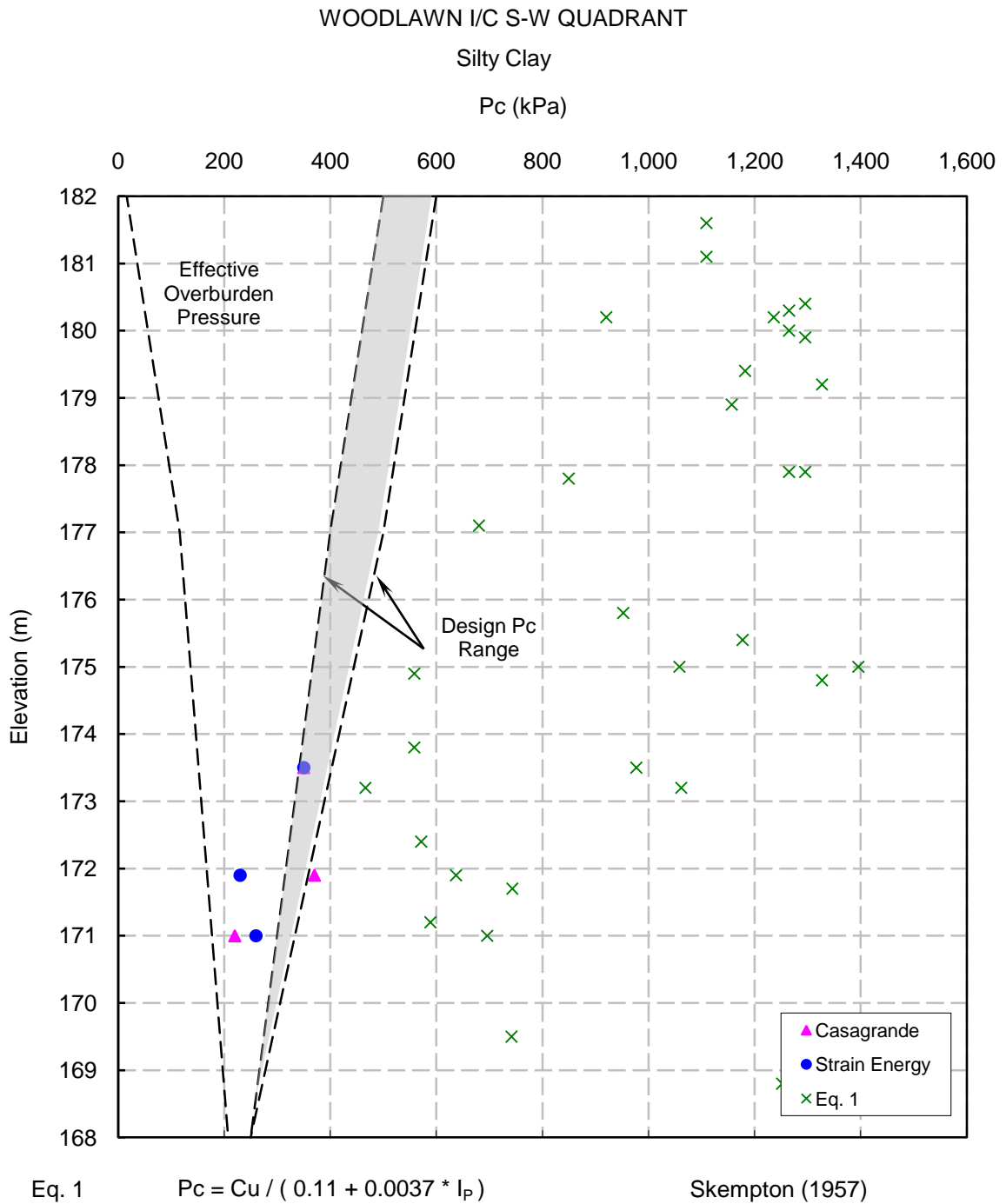
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED PRECONSOLIDATION STRESS

FIGURE F3-1



C:\Users\CHRISA\Documents\1111-09-4135 Soil Parameter Estimation-Woodlawn SW.xls

Project No. : 1-09-4135

Date : September, 2010



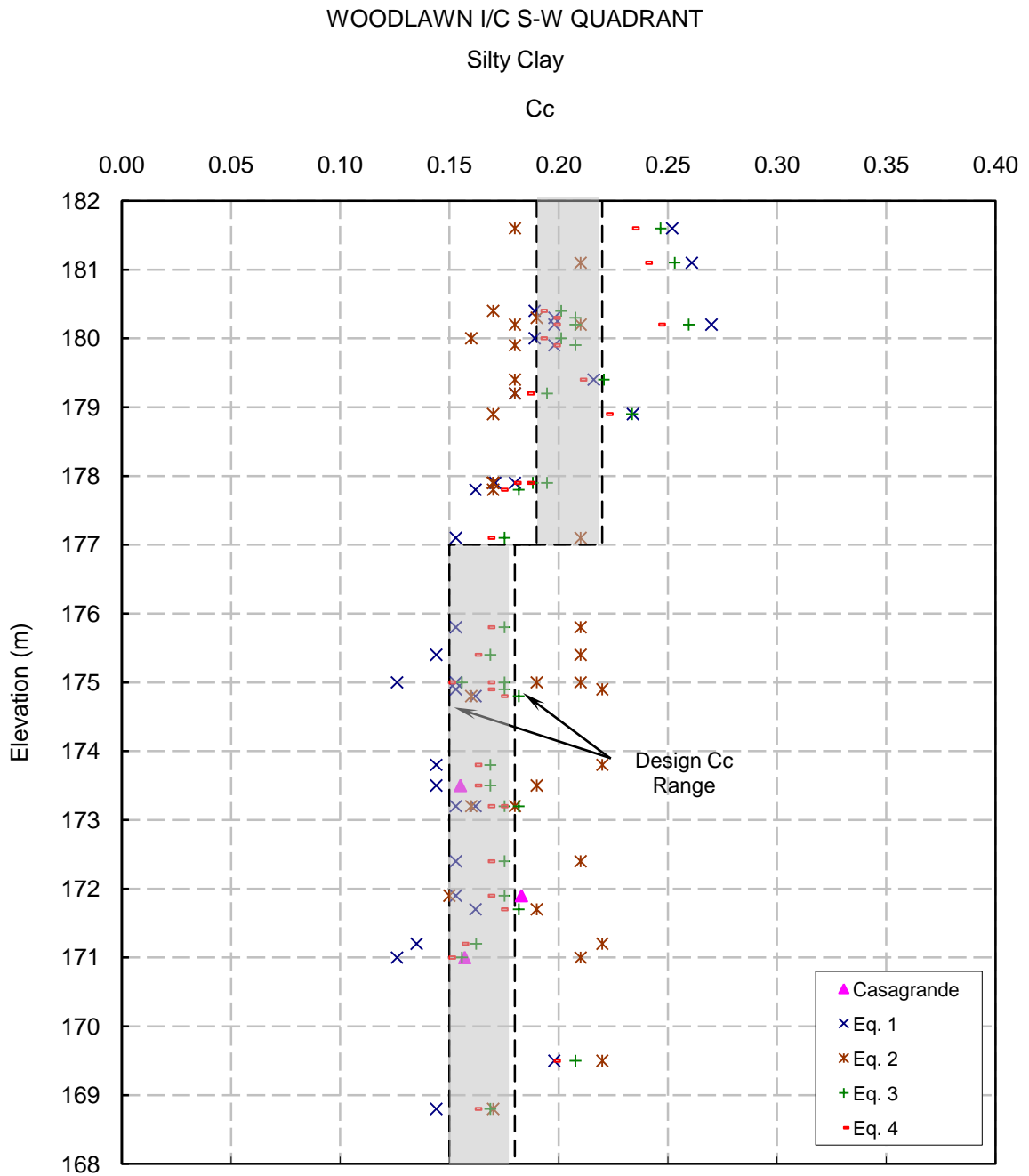
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED COMPRESSION INDEX

FIGURE F3-2



Eq. 1 $Cc = 0.009 * (LL - 10)$

Terzaghi & Peck (1967)

Eq. 2 $Cc = 0.01 * \omega$

Osterberg (1972)

Eq. 3 $Cc = 0.002343 * LL * Gs$

Nagaraj & Murty (1985)

Eq. 4 $Cc = 0.006 * (LL + 1)$

Lav & Ansal (2001)

Project No. : 1-09-4135

Date : September, 2010



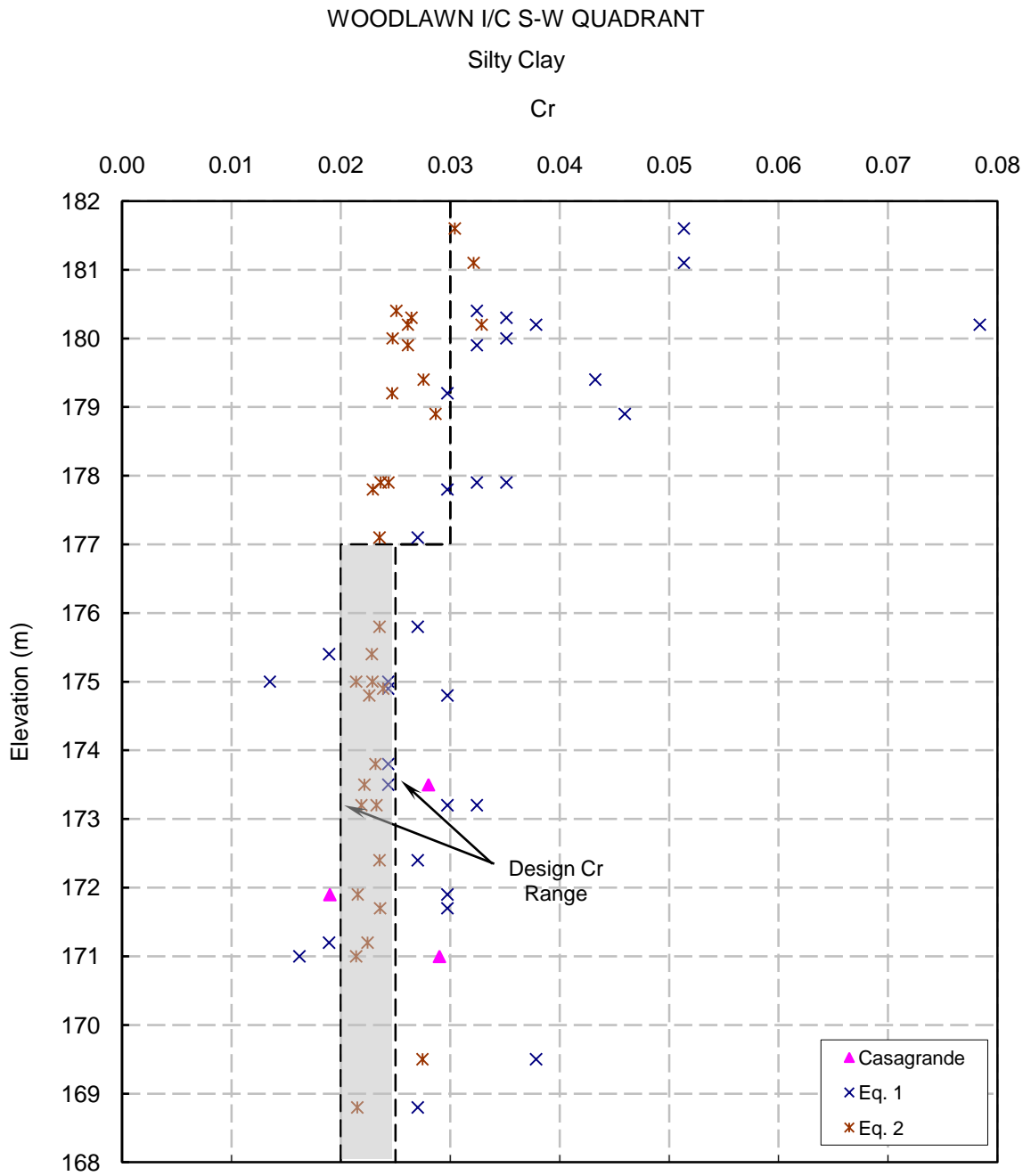
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED RECOMPRESSION INDEX

FIGURE F3-3



Eq. 1 $Cr = Ip / 370$

Kulhawy & Mayne (1990)

Eq. 2 $Cr = Cc / 5 \sim Cc / 10$

Das (1993)

Project No. : 1-09-4135

Date : September, 2010



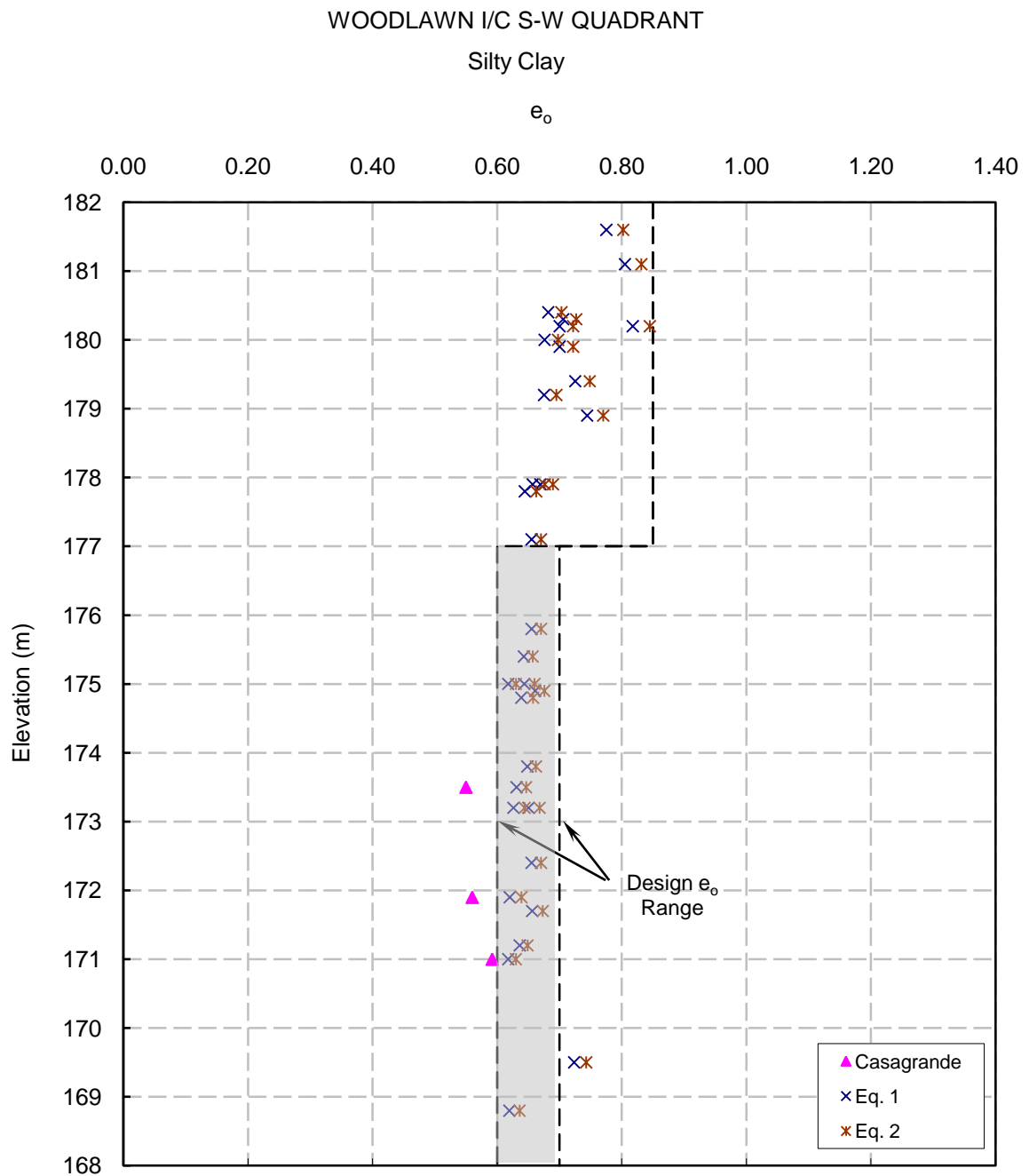
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED VOID RATIO

FIGURE F3-4



Eq. 1 $e_o = (Cc - 0.256) / 0.43 + 0.84$

derived from Cozzolino (1961)

Eq. 2 $e_o = Cc / 0.40 - 0.001 * \omega + 0.25$

derived from Azzouz et al. (1976)

C:\Users\CHRISA\Documents\1111-09-4135 Soil Parameter Estimation-Woodlawn SW.xls

Project No. : 1-09-4135

Date : September, 2010



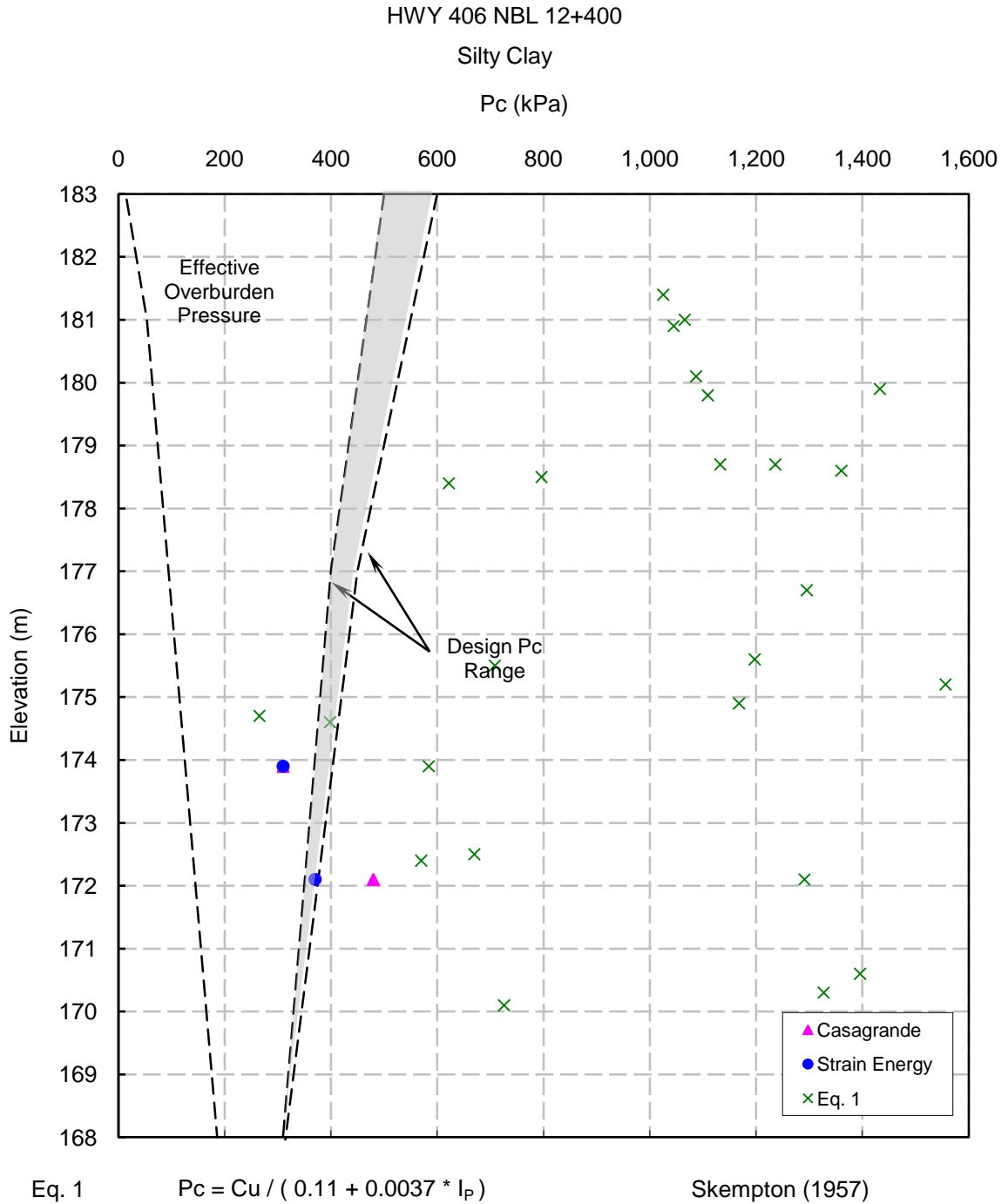
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED PRECONSOLIDATION STRESS

FIGURE F4-1



Project No. : 1-09-4135

Date : September, 2010



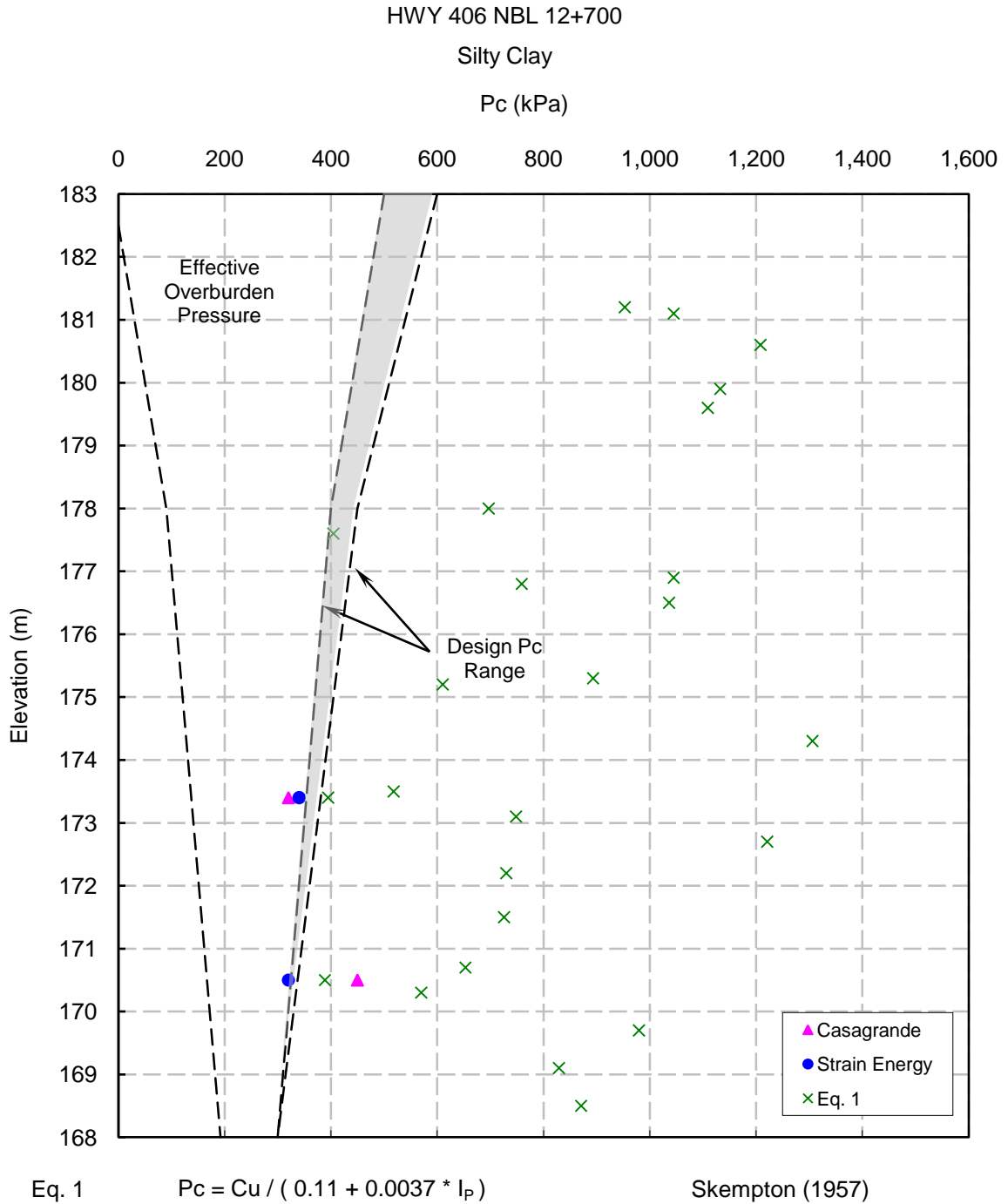
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED PRECONSOLIDATION STRESS

FIGURE F4-2



C:\Users\CHRISA\Documents\1111-09-4135 Soil Parameter Estimation-WN.xls

Project No. : 1-09-4135

Date : September, 2010



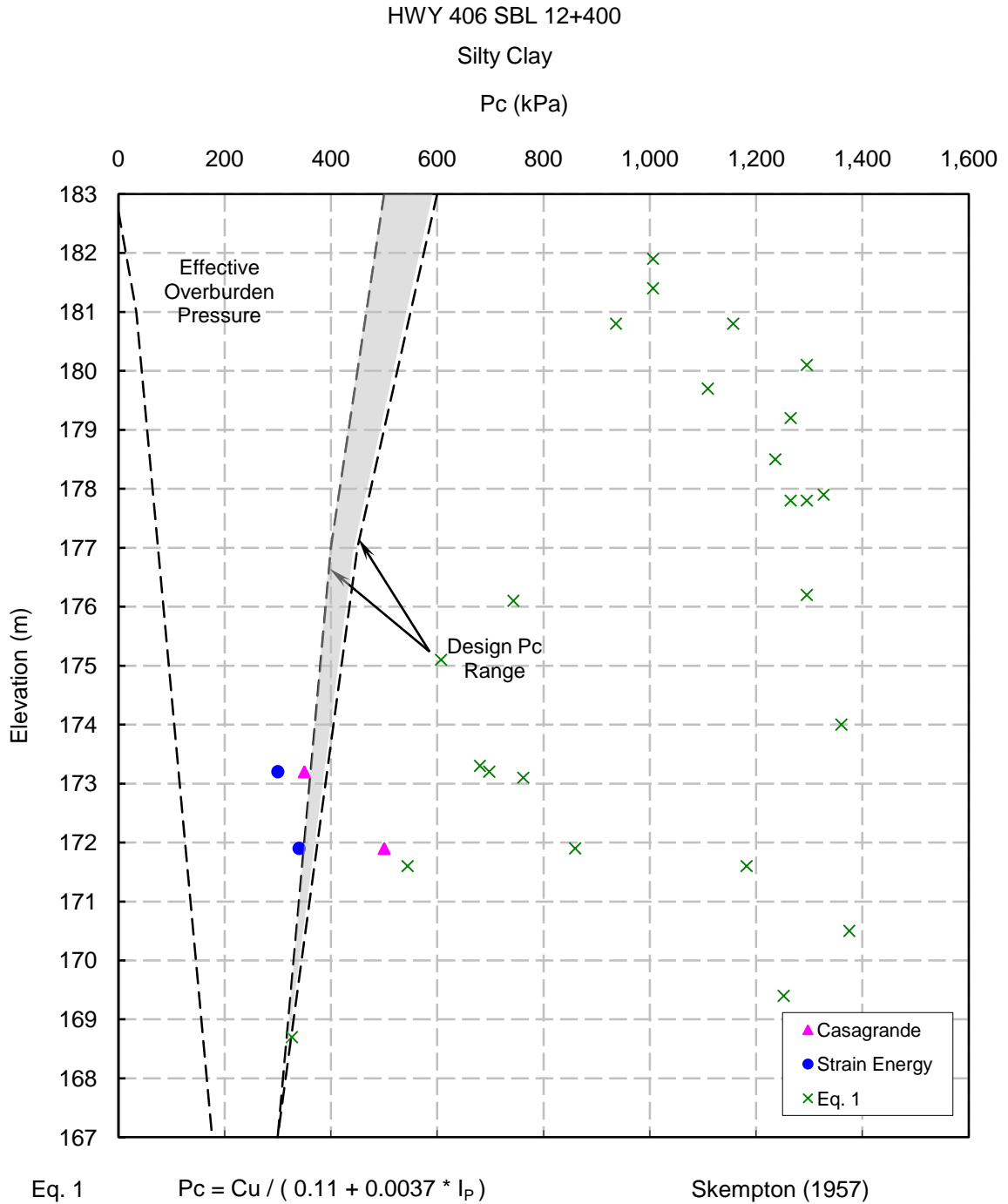
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED PRECONSOLIDATION STRESS

FIGURE F4-3



Project No. : 1-09-4135

Date : September, 2010



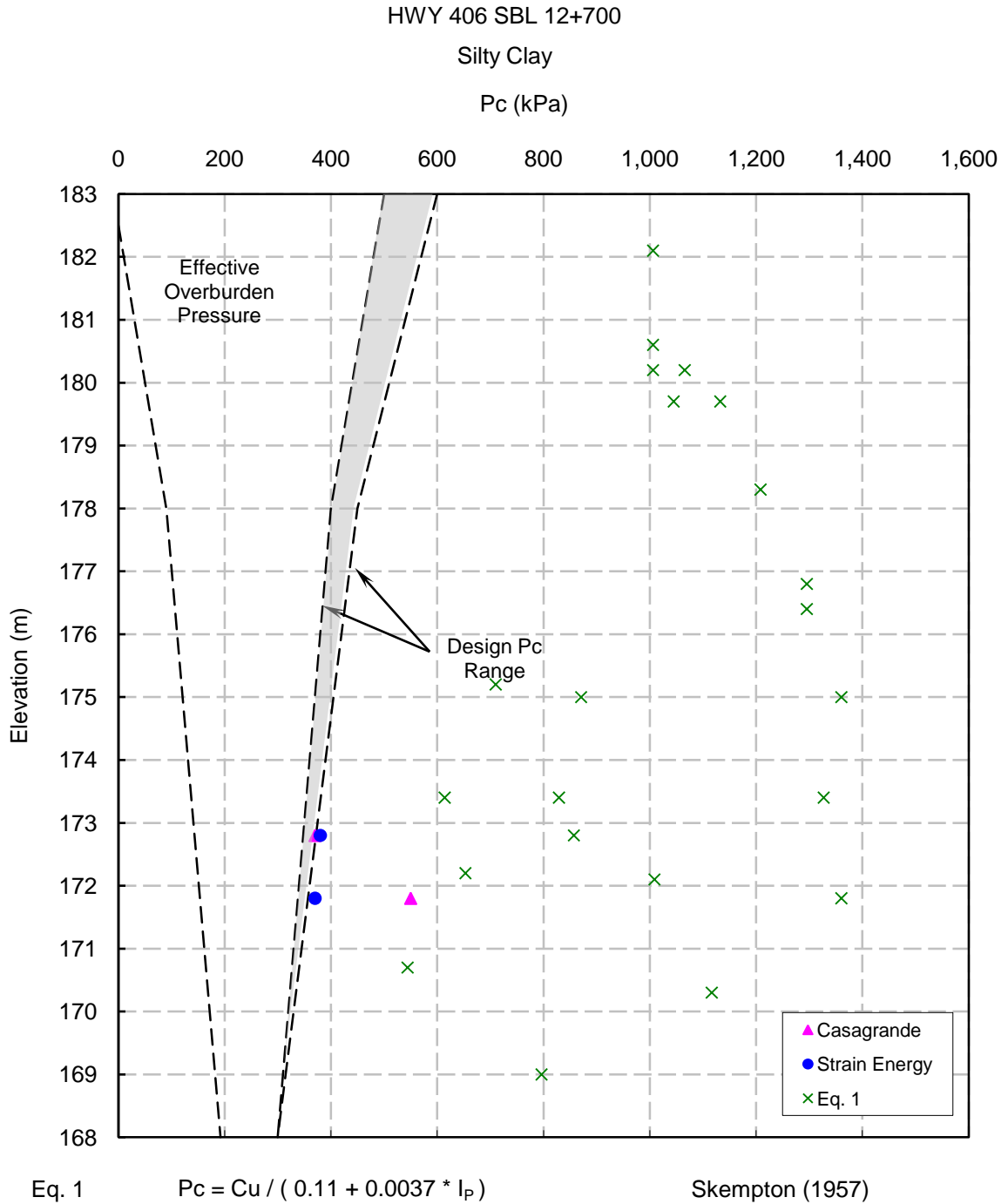
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED PRECONSOLIDATION STRESS

FIGURE F4-4



C:\Users\CHRISA\Documents\1111-09-4135 Soil Parameter Estimation-WS.xls

Project No. : 1-09-4135

Date : September, 2010



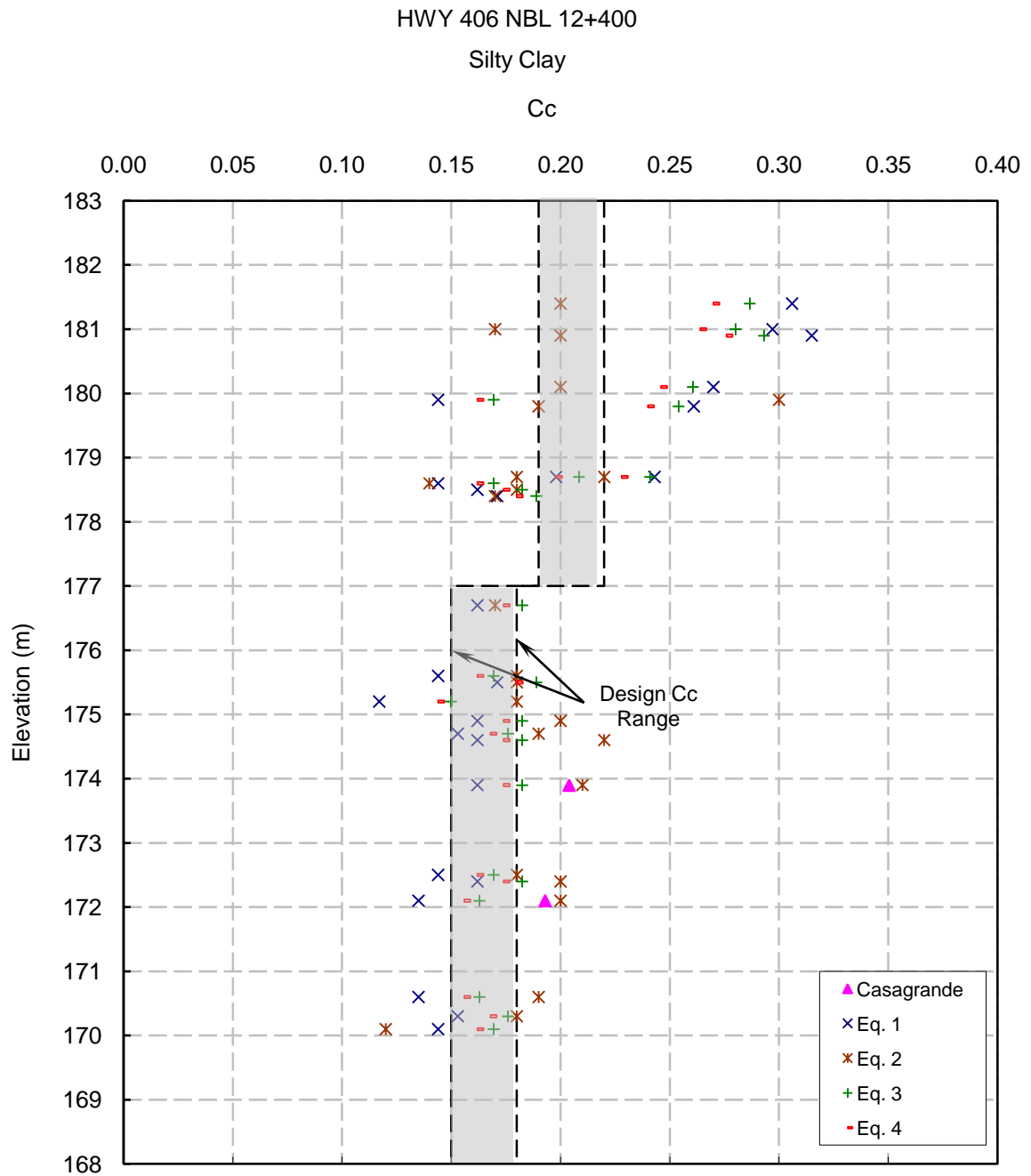
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED COMPRESSION INDEX

FIGURE F4-5



Eq. 1 $Cc = 0.009 * (LL - 10)$

Terzaghi & Peck (1967)

Eq. 2 $Cc = 0.01 * \omega$

Osterberg (1972)

Eq. 3 $Cc = 0.002343 * LL * Gs$

Nagaraj & Murty (1985)

Eq. 4 $Cc = 0.006 * (LL + 1)$

Lav & Ansal (2001)

Project No. : 1-09-4135

Date : September, 2010



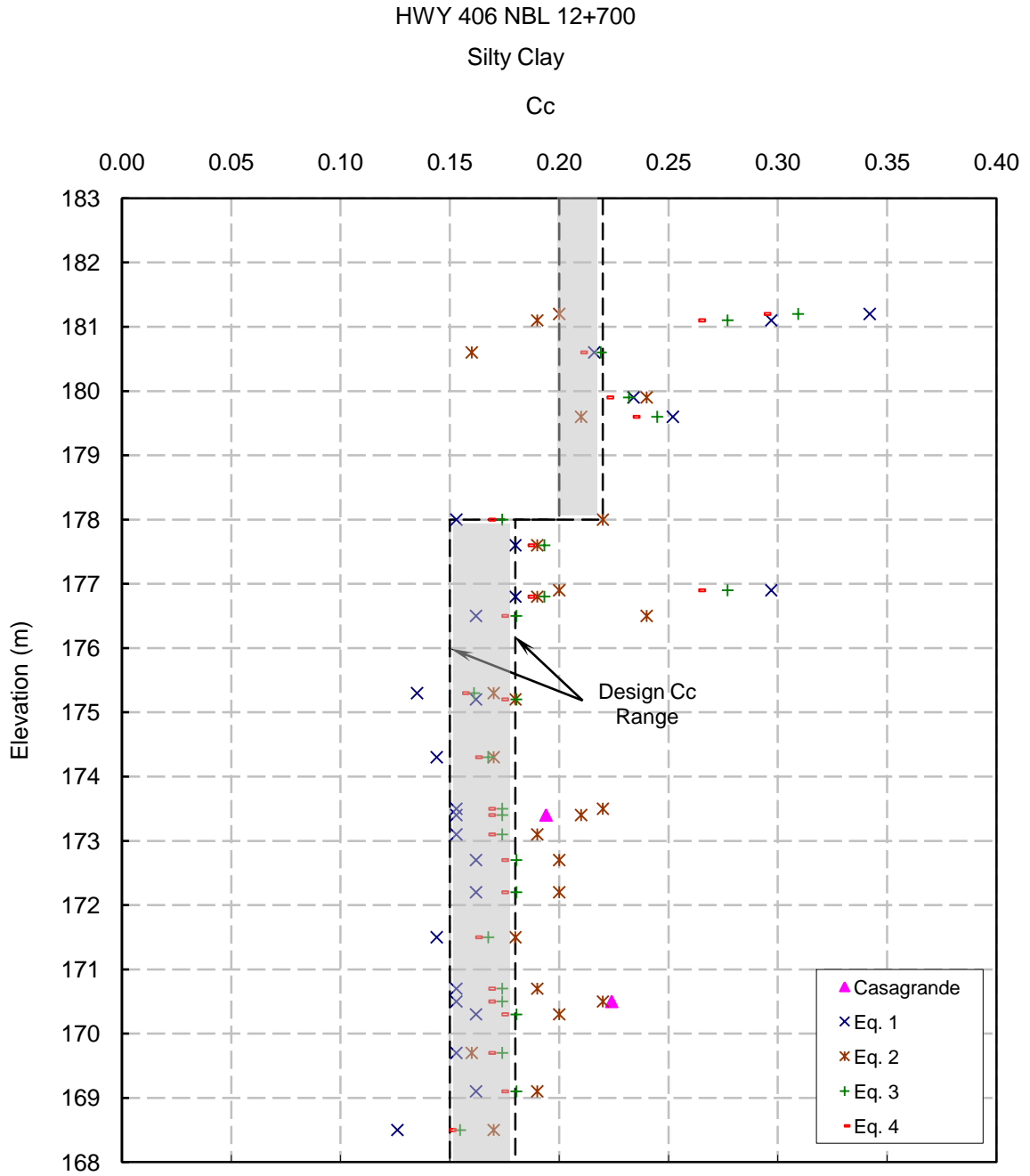
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED COMPRESSION INDEX

FIGURE F4-6



Eq. 1 $Cc = 0.009 * (LL - 10)$

Terzaghi & Peck (1967)

Eq. 2 $Cc = 0.01 * \omega$

Osterberg (1972)

Eq. 3 $Cc = 0.002343 * LL * Gs$

Nagaraj & Murty (1985)

Eq. 4 $Cc = 0.006 * (LL + 1)$

Lav & Ansal (2001)

Project No. : 1-09-4135

Date : September, 2010



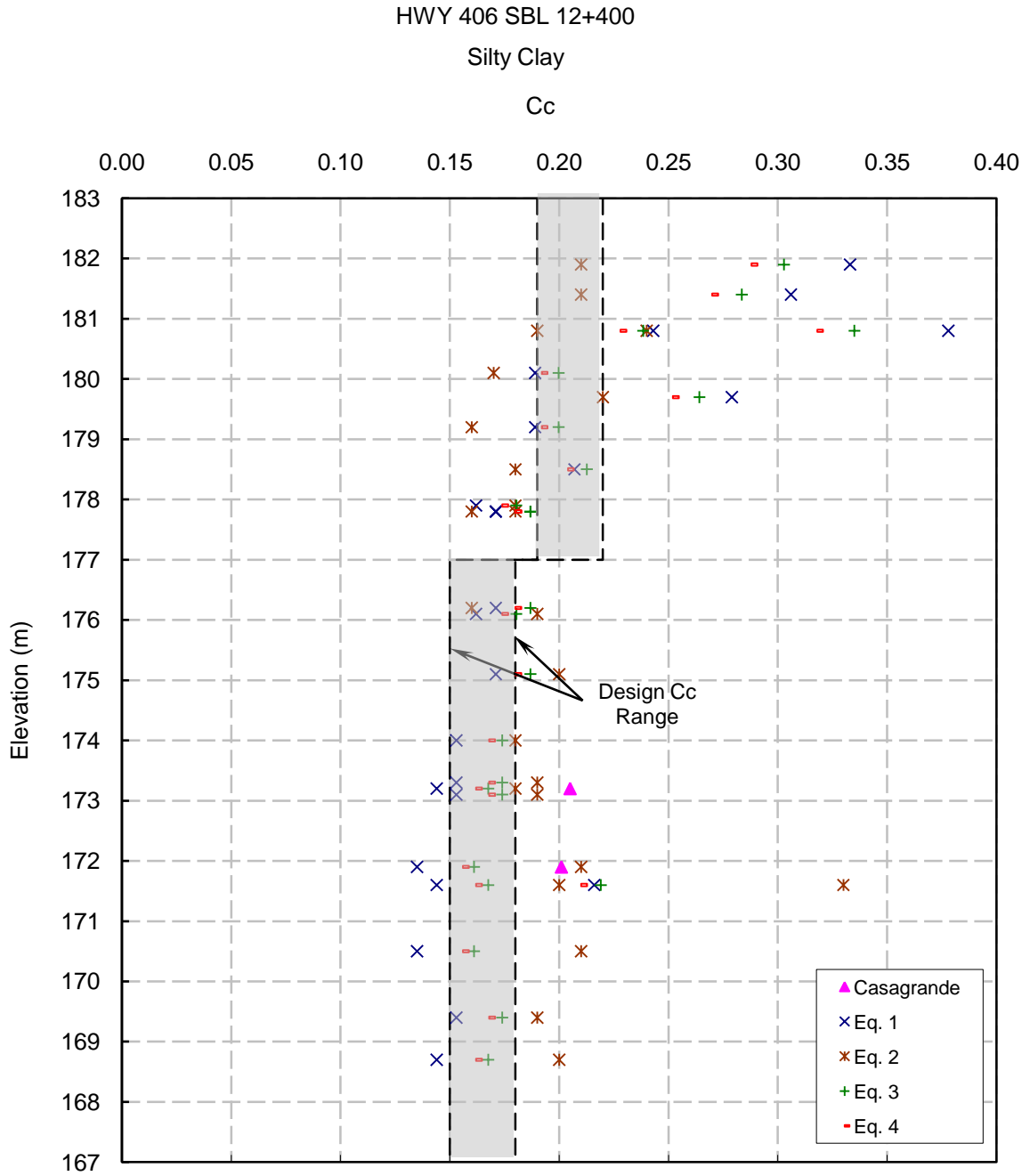
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED COMPRESSION INDEX

FIGURE F4-7



Eq. 1 $Cc = 0.009 * (LL - 10)$

Terzaghi & Peck (1967)

Eq. 2 $Cc = 0.01 * \omega$

Osterberg (1972)

Eq. 3 $Cc = 0.002343 * LL * Gs$

Nagaraj & Murty (1985)

Eq. 4 $Cc = 0.006 * (LL + 1)$

Lav & Ansal (2001)

Project No. : 1-09-4135

Date : September, 2010



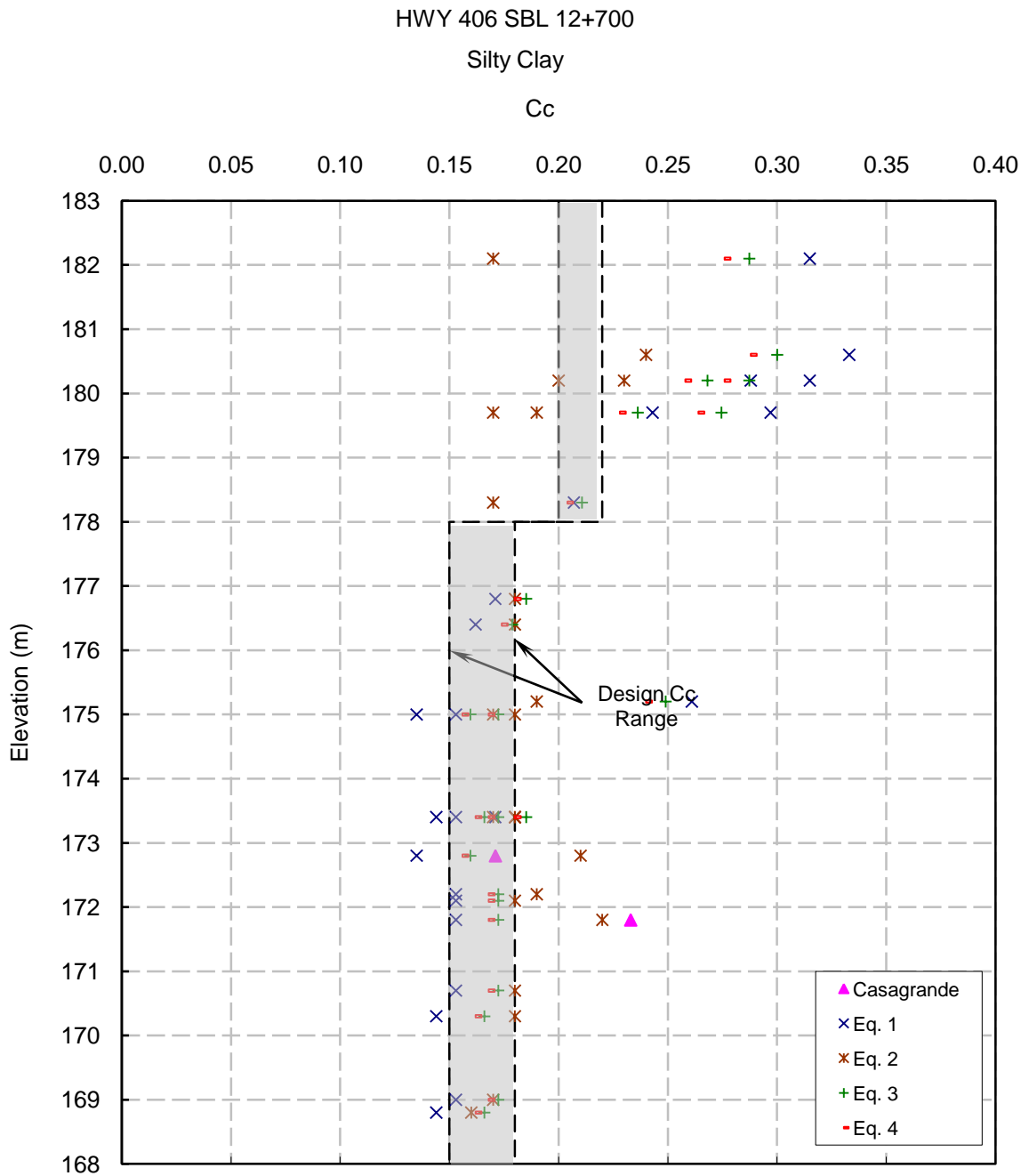
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED COMPRESSION INDEX

FIGURE F4-8



Eq. 1 $Cc = 0.009 * (LL - 10)$

Terzaghi & Peck (1967)

Eq. 2 $Cc = 0.01 * \omega$

Osterberg (1972)

Eq. 3 $Cc = 0.002343 * LL * Gs$

Nagaraj & Murty (1985)

Eq. 4 $Cc = 0.006 * (LL + 1)$

Lav & Ansal (2001)

Project No. : 1-09-4135

Date : September, 2010



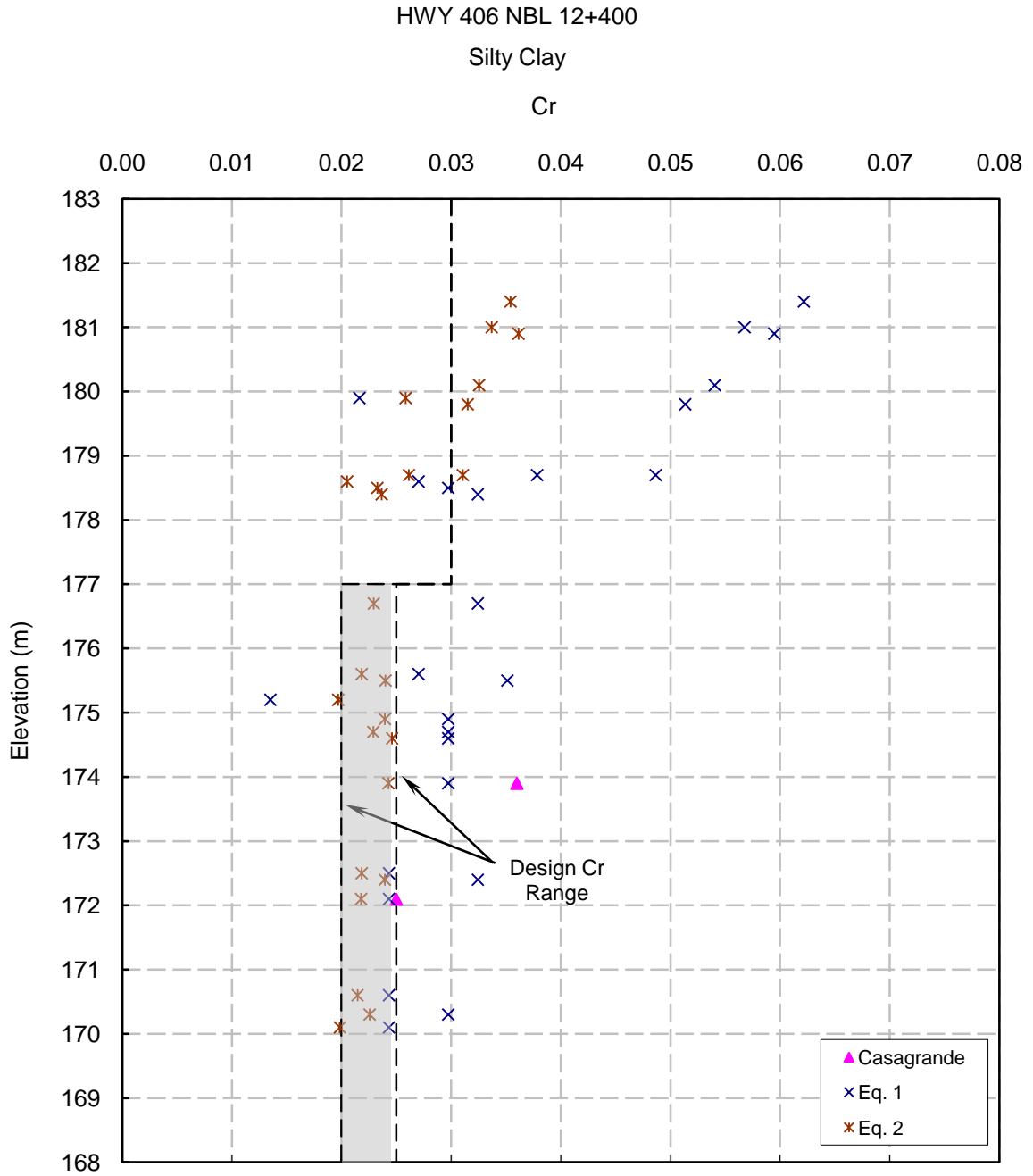
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED RECOMPRESSION INDEX

FIGURE F4-9



Eq. 1 $Cr = Ip / 370$

Kulhawy & Mayne (1990)

Eq. 2 $Cr = Cc / 5 \sim Cc / 10$

Das (1993)

Project No. : 1-09-4135

Date : September, 2010



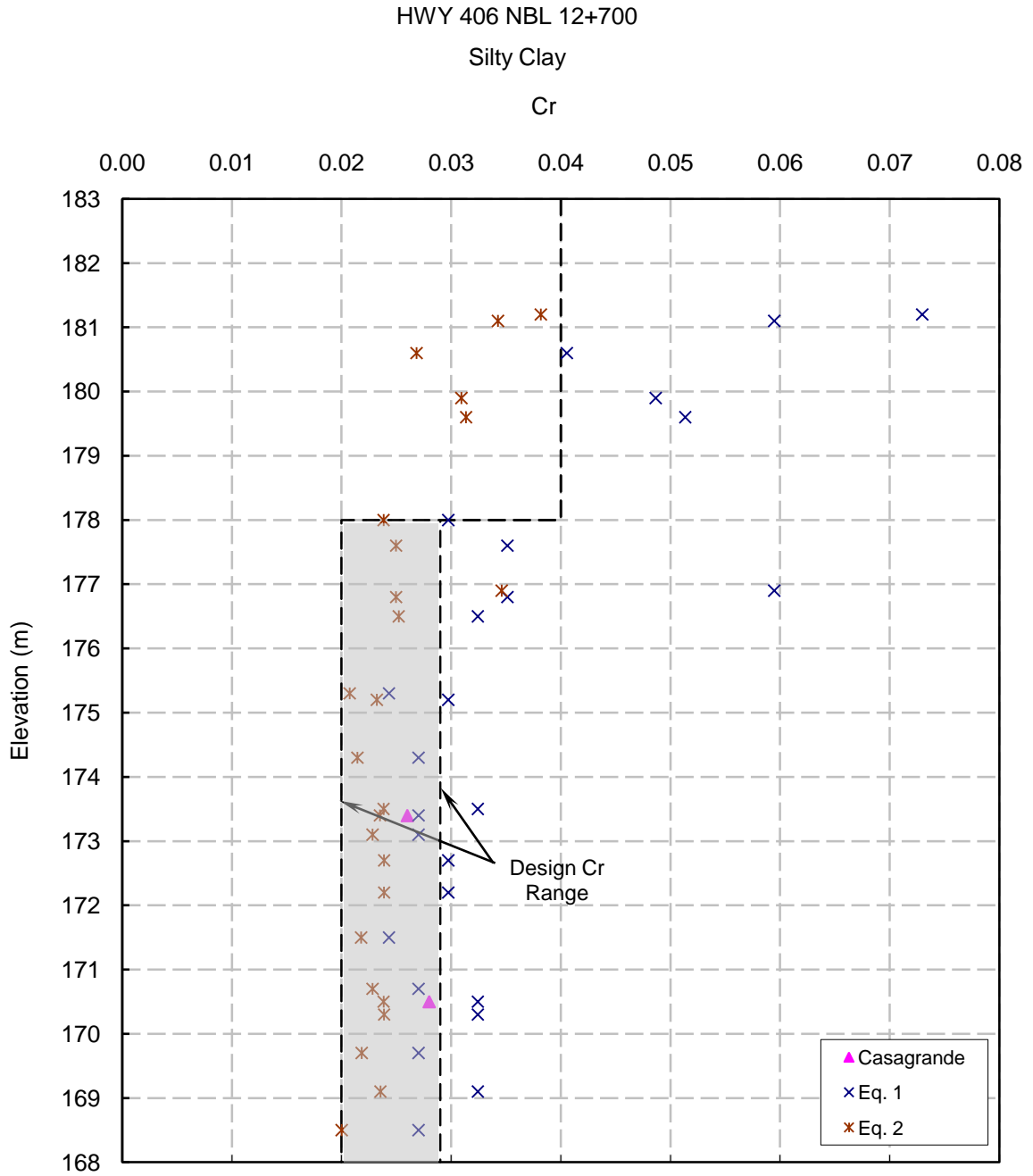
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED RECOMPRESSION INDEX

FIGURE F4-10



Eq. 1 $Cr = Ip / 370$

Kulhawy & Mayne (1990)

Eq. 2 $Cr = Cc / 5 \sim Cc / 10$

Das (1993)

Project No. : 1-09-4135

Date : September, 2010



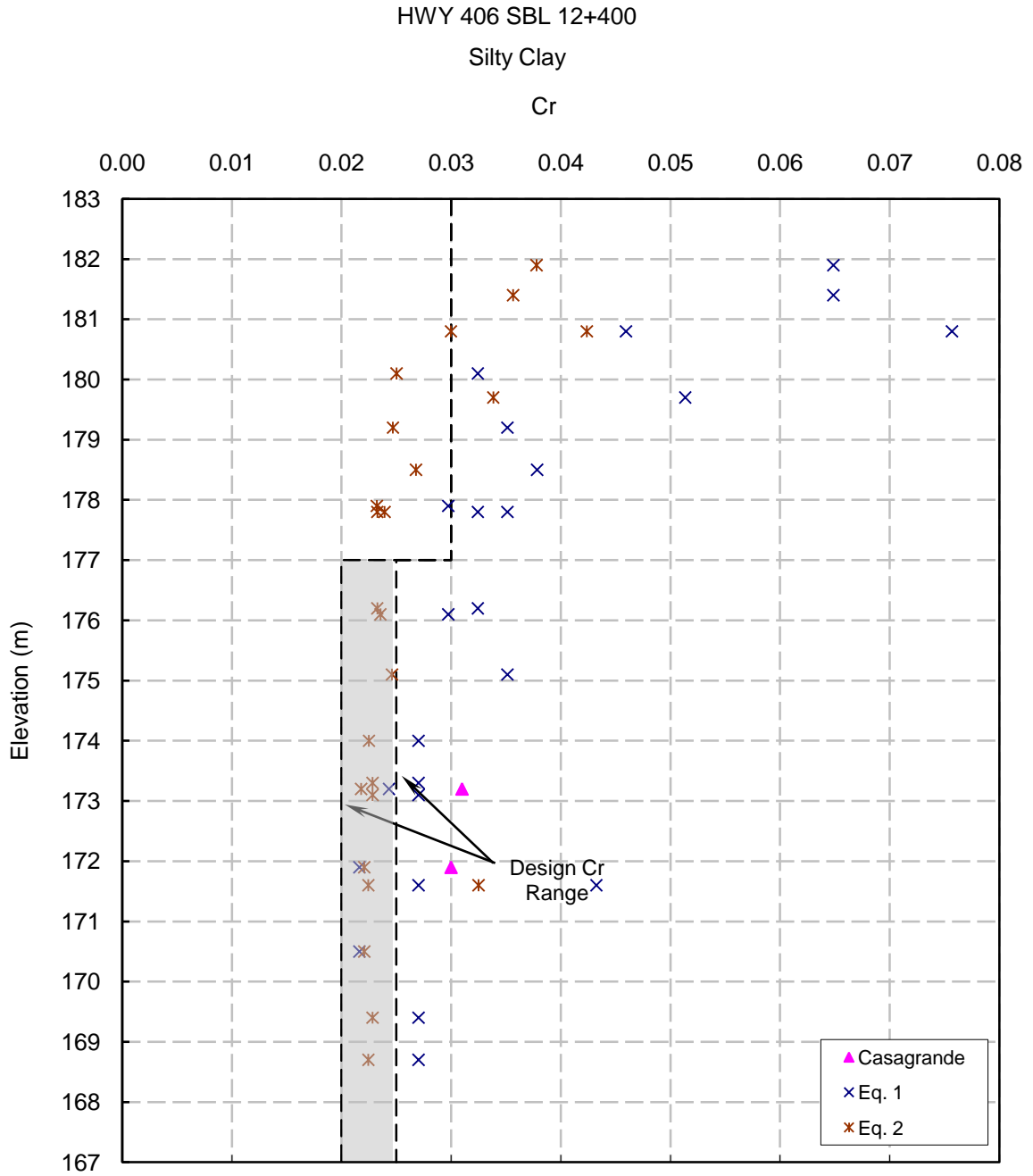
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED RECOMPRESSION INDEX

FIGURE F4-11



Eq. 1 $Cr = Ip / 370$

Kulhawy & Mayne (1990)

Eq. 2 $Cr = Cc / 5 \sim Cc / 10$

Das (1993)

Project No. : 1-09-4135

Date : September, 2010



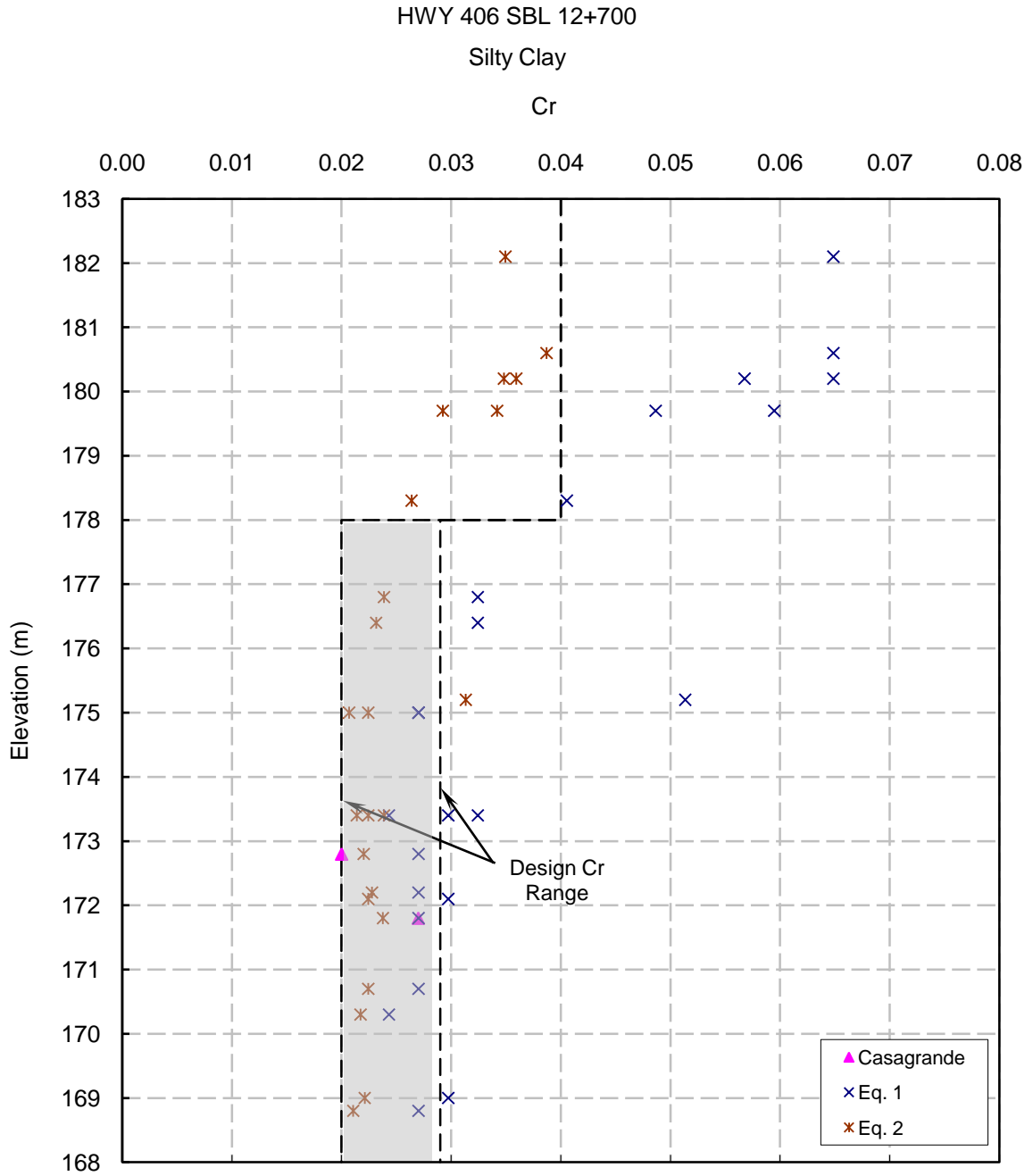
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED RECOMPRESSION INDEX

FIGURE F4-12



Eq. 1

$Cr = Ip / 370$

Kulhawy & Mayne (1990)

Eq. 2

$Cr = Cc / 5 \sim Cc / 10$

Das (1993)

Project No. : 1-09-4135

Date : September, 2010



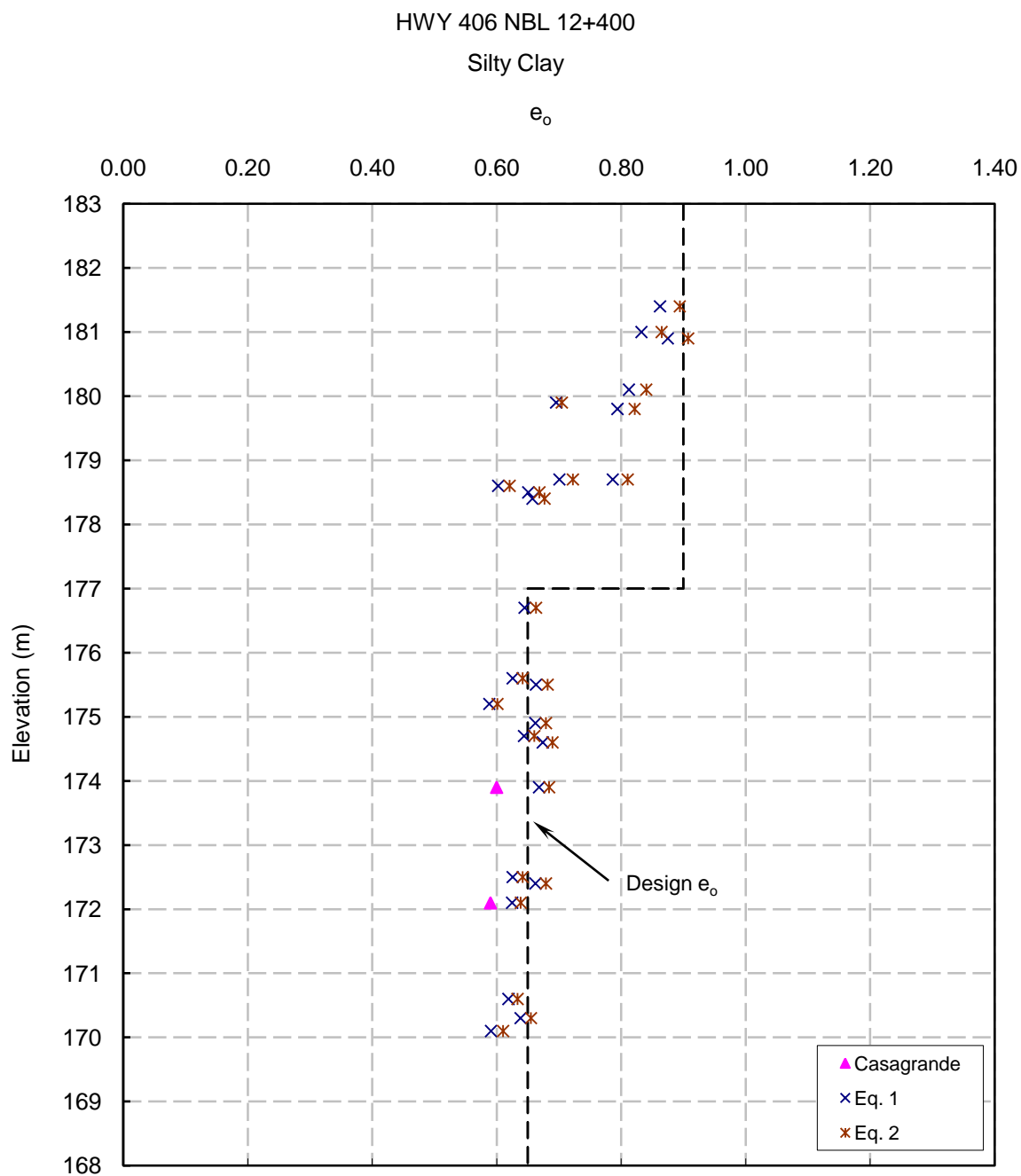
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED VOID RATIO

FIGURE F4-13



Eq. 1 $e_o = (Cc - 0.256) / 0.43 + 0.84$

derived from Cozzolino (1961)

Eq. 2 $e_o = Cc / 0.40 - 0.001 * \omega + 0.25$

derived from Azzouz et al. (1976)

C:\Users\CHRISA\Documents\1111-09-4135 Soil Parameter Estimation-TN.xls

Project No. : 1-09-4135

Date : September, 2010



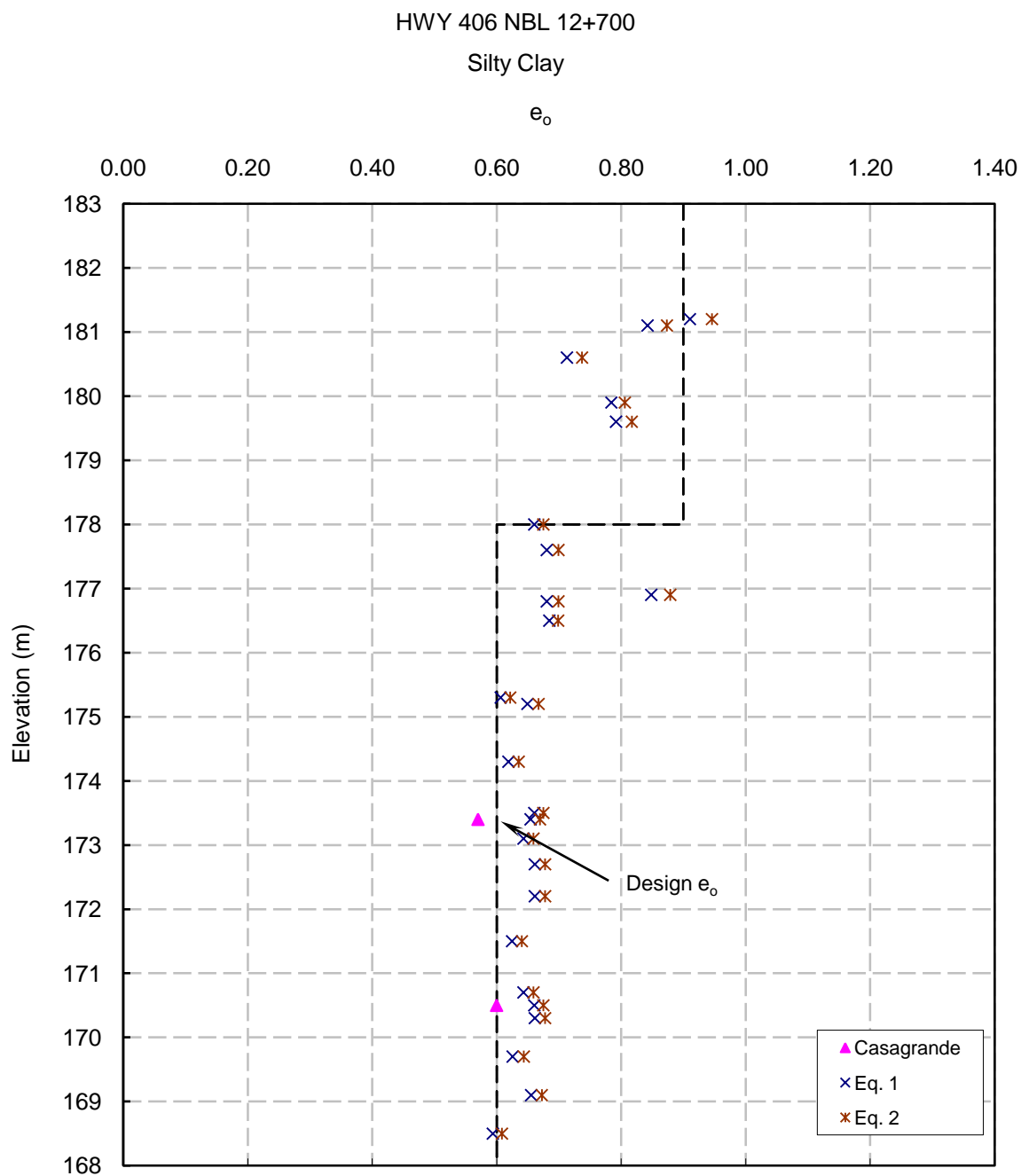
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED VOID RATIO

FIGURE F4-14



Eq. 1 $e_o = (C_c - 0.256) / 0.43 + 0.84$

derived from Cozzolino (1961)

Eq. 2 $e_o = C_c / 0.40 - 0.001 * \omega + 0.25$

derived from Azzouz et al. (1976)

C:\Users\CHRISA\Documents\1111-09-4135 Soil Parameter Estimation-WN.xls

Project No. : 1-09-4135

Date : September, 2010



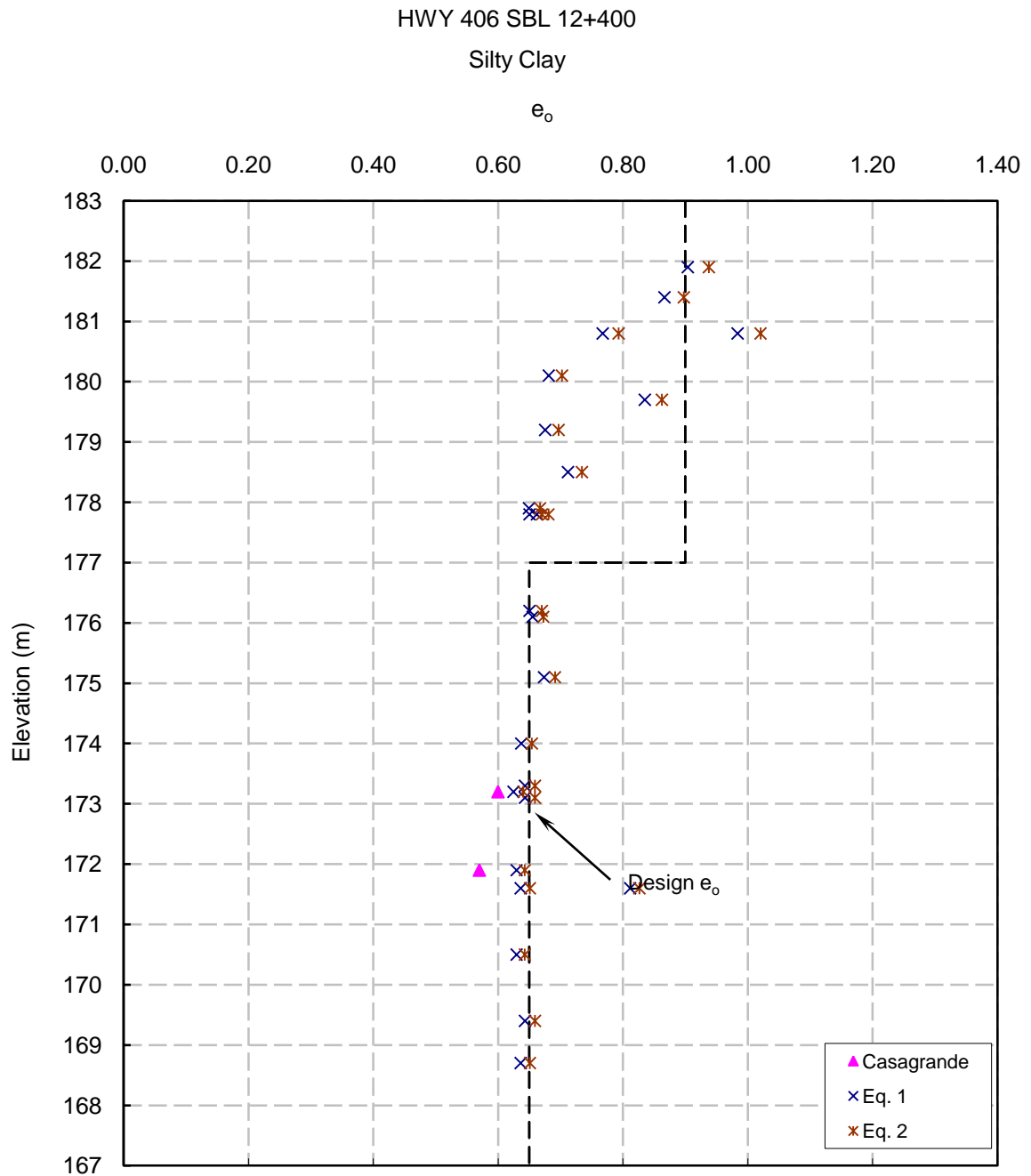
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED VOID RATIO

FIGURE F4-15



Eq. 1 $e_o = (Cc - 0.256) / 0.43 + 0.84$

derived from Cozzolino (1961)

Eq. 2 $e_o = Cc / 0.40 - 0.001 * \omega + 0.25$

derived from Azzouz et al. (1976)

C:\Users\CHRISA\Documents\1111-09-4135 Soil Parameter Estimation-TS.xls

Project No. : 1-09-4135

Date : September, 2010



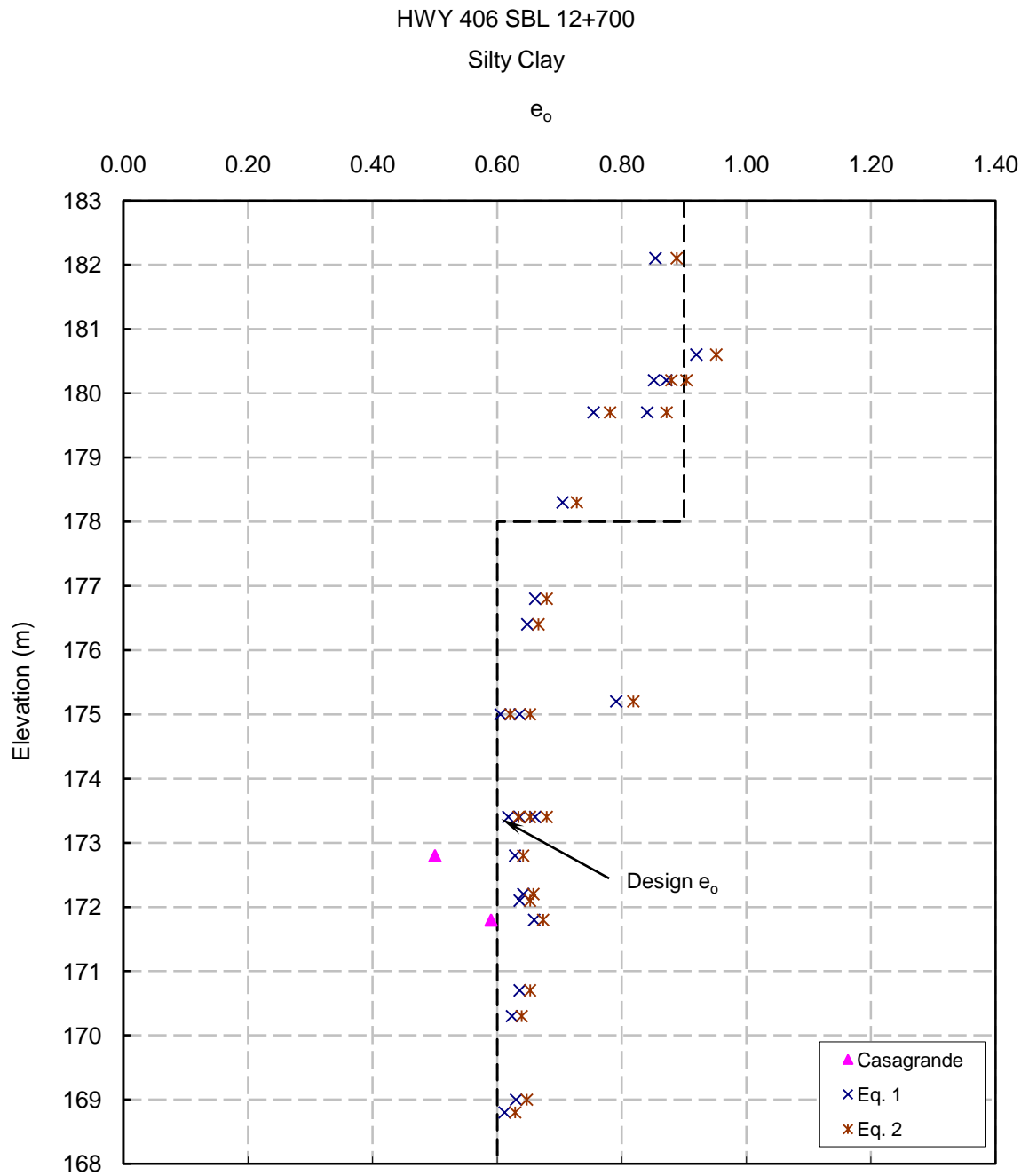
Terraprobe Inc.

Prepared By : HW

Checked By : RA

PREDICTED AND MEASURED VOID RATIO

FIGURE F4-16



Eq. 1 $e_o = (C_c - 0.256) / 0.43 + 0.84$

derived from Cozzolino (1961)

Eq. 2 $e_o = C_c / 0.40 - 0.001 * \omega + 0.25$

derived from Azzouz et al. (1976)

C:\Users\CHRISA\Documents\1111-09-4135 Soil Parameter Estimation-WS.xls

Project No. : 1-09-4135

Date : September, 2010



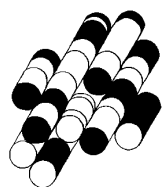
Terraprobe Inc.

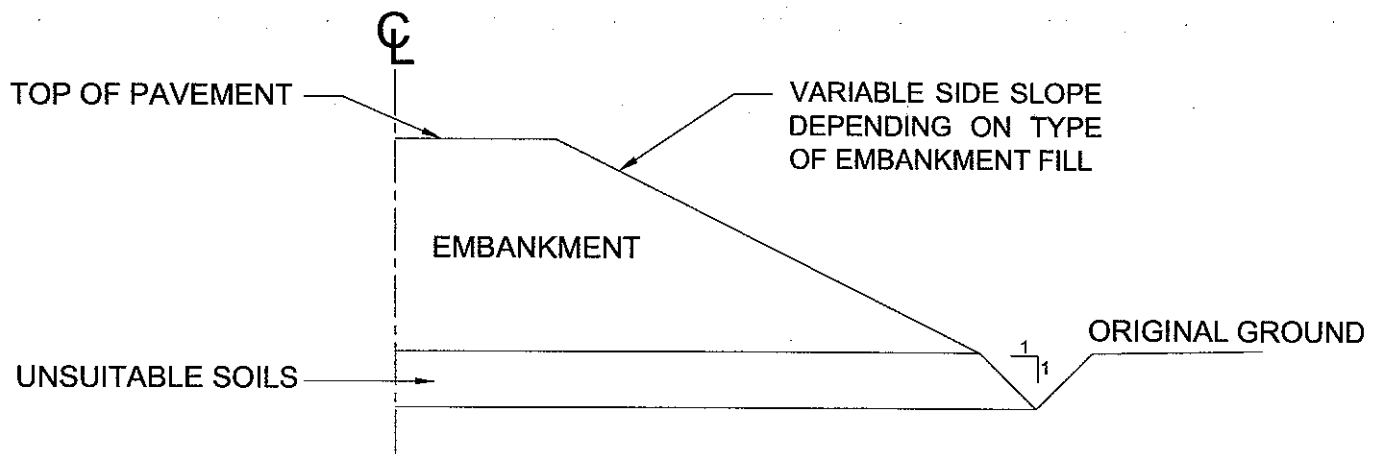
Prepared By : HW

Checked By : RA

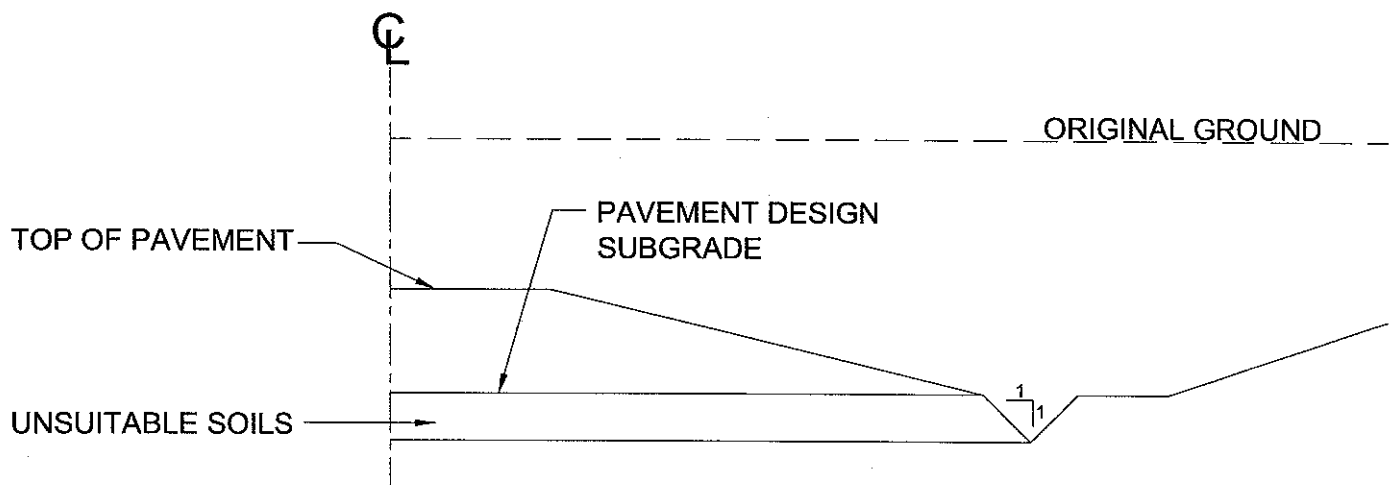
APPENDIX G

TERRAPROBE INC.



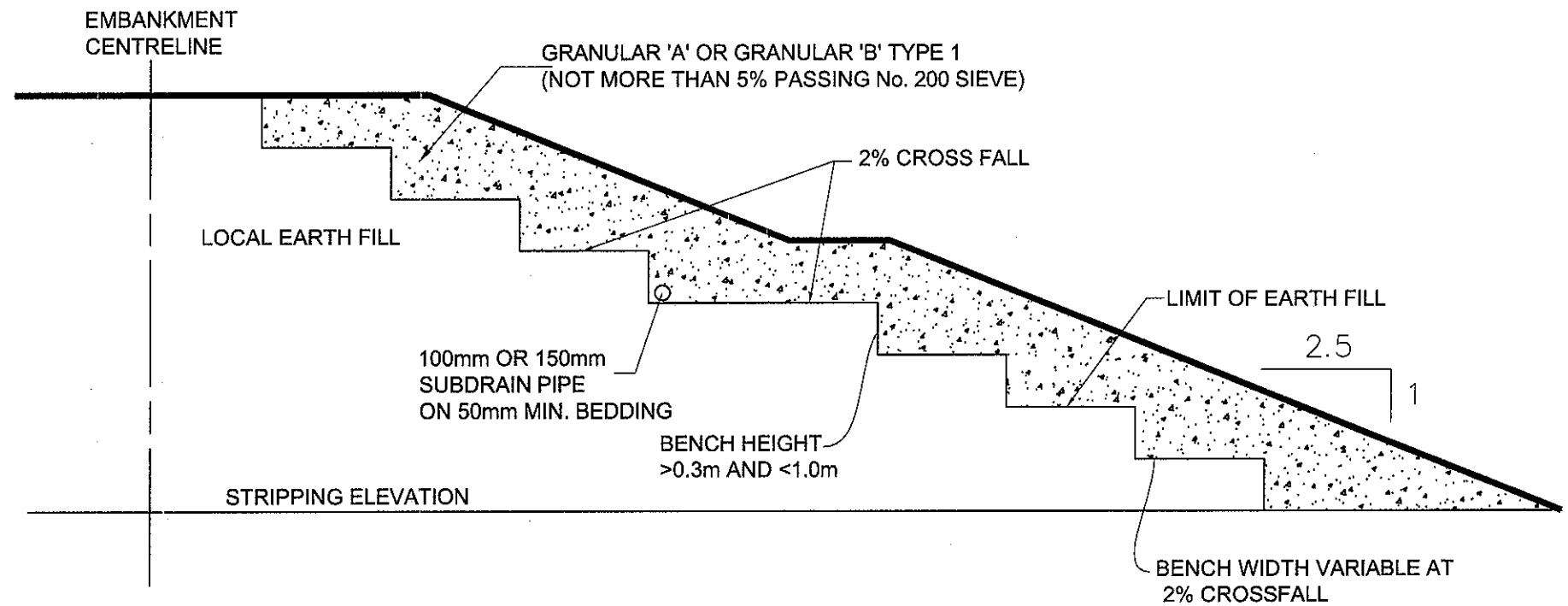


FILL SECTION



CUT SECTION

N.T.S. **ENVELOPE FOR REMOVAL OF UNSUITABLE MATERIAL**



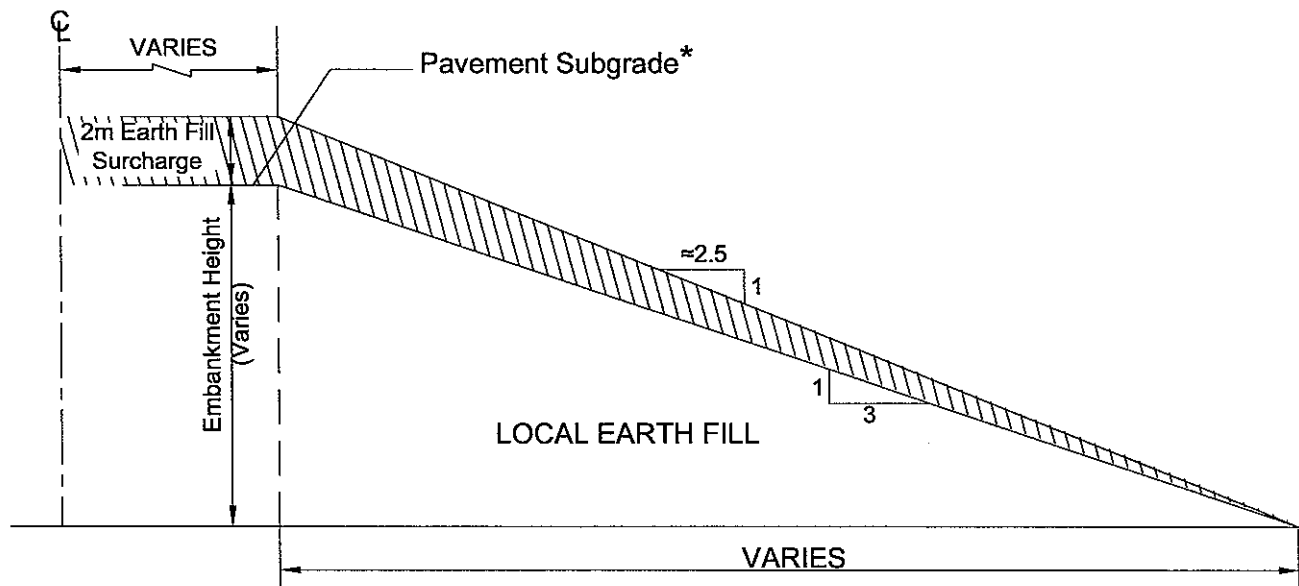
NOTES: FLOW FROM SUBDRAIN PIPE TO OUTLET FREELY AND BE DIRECTED TO ARMoured OUTFALLS /OUTLETS DESIGNED TO DRAIN INTO ROADSIDE DITCHES.

N.T.S.

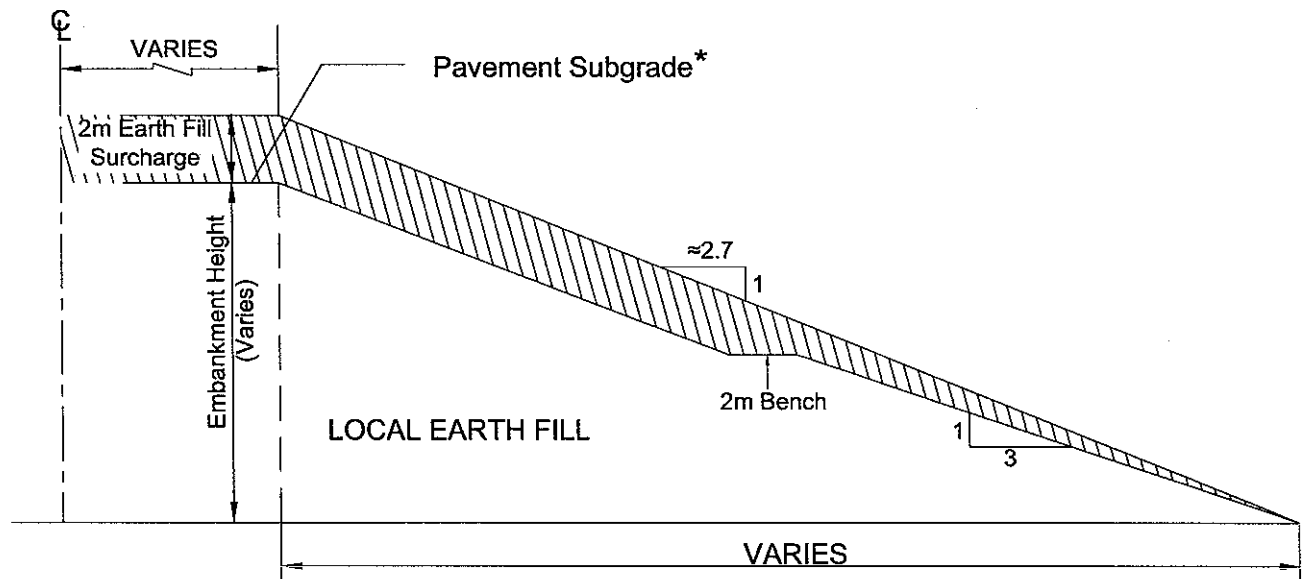
COMPOSITE EMBANKMENT DETAILS

TERRAPROBE

FIGURE G2



Local Earth Fill Embankment < 8m



Local Earth Fill Embankment $8\text{m} \geq 12\text{m}$

* Notes- Pavement subgrade to be established after removal of surcharge

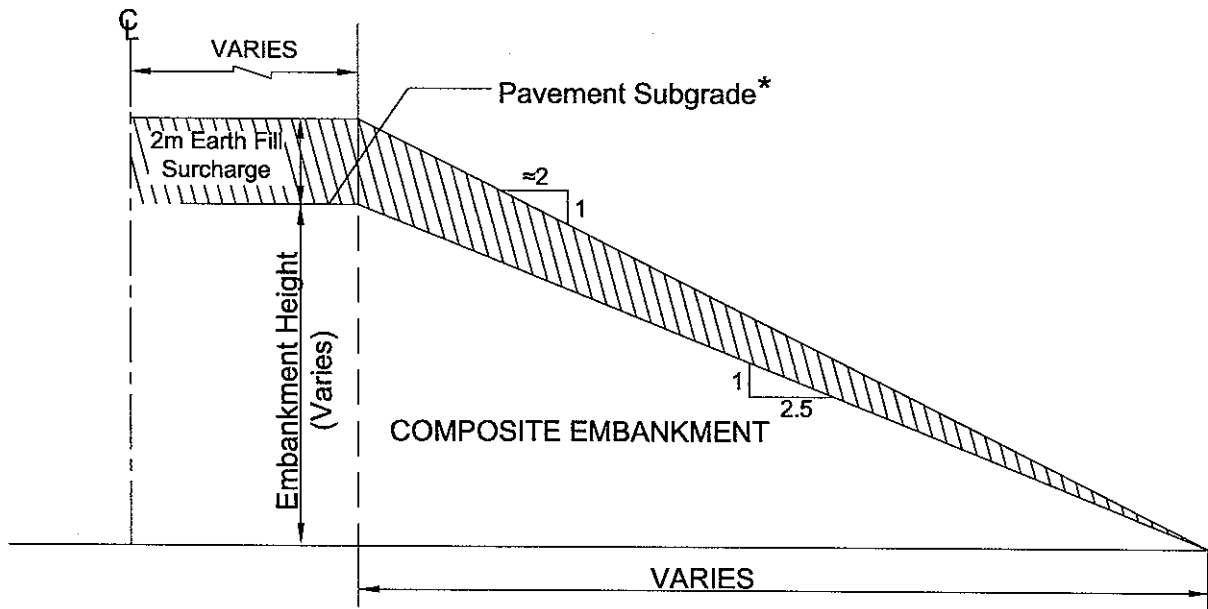
N.T.S

SURCHARGE ARRANGEMENT

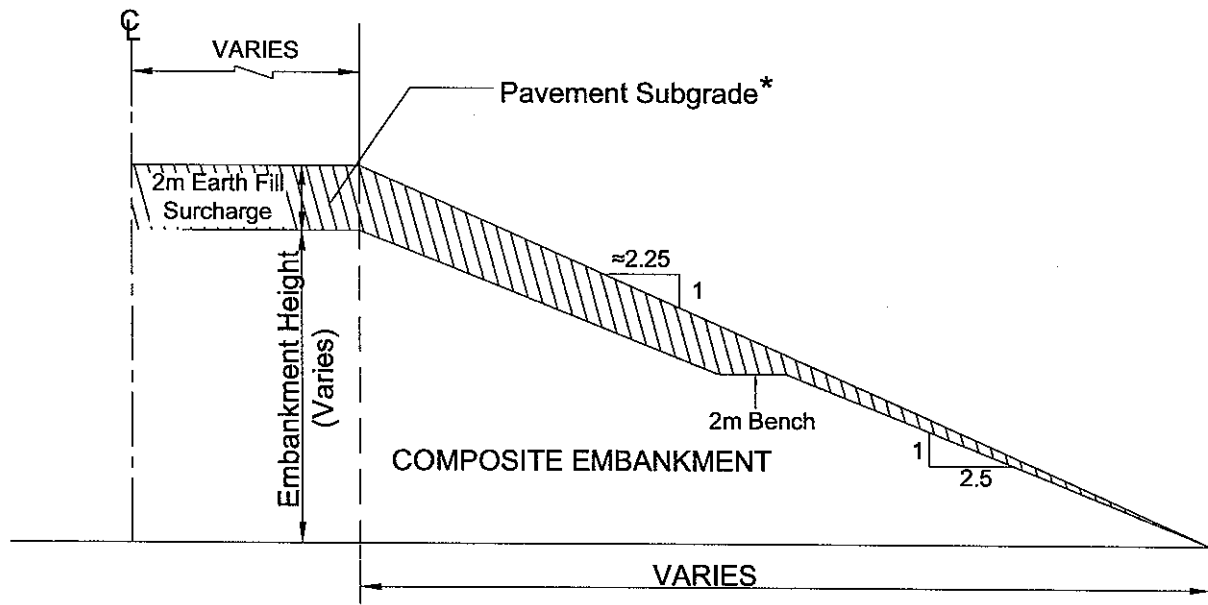
TERRAPROBE

File No. 1-09-4135

FIGURE G3



Composite Embankment <8m



Composite Embankment 8m \geq 12m

- * Notes- Pavement subgrade to be established after removal of surcharge.
Embankment and surcharge constructed initially with local earth fill and granular face installed after removal of surcharge.

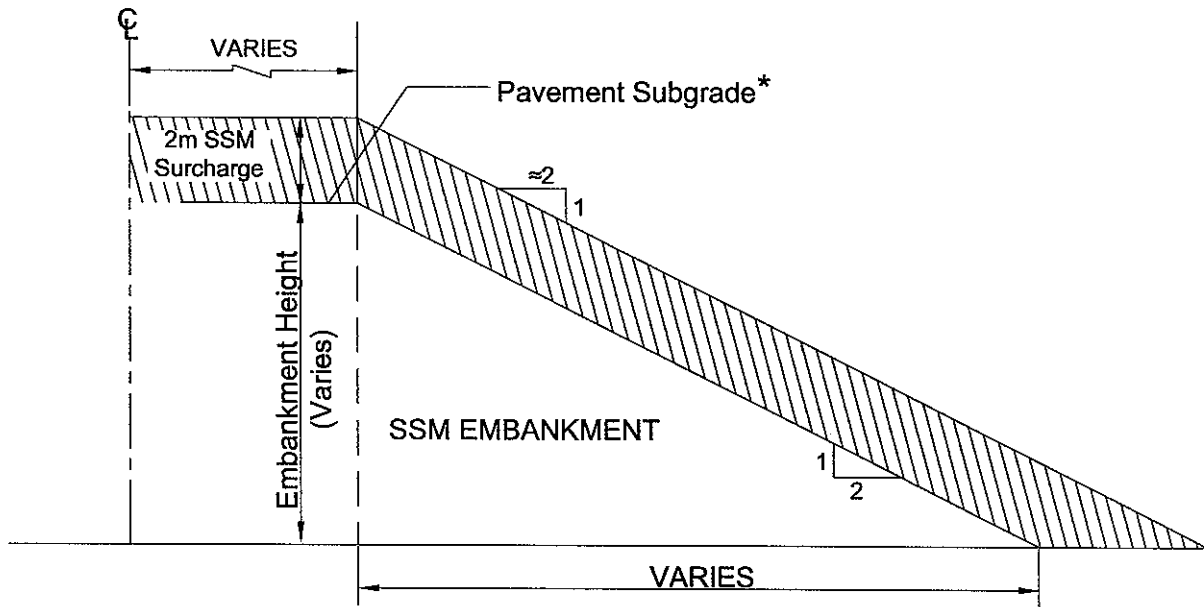
N.T.S

SURCHARGE ARRANGEMENT

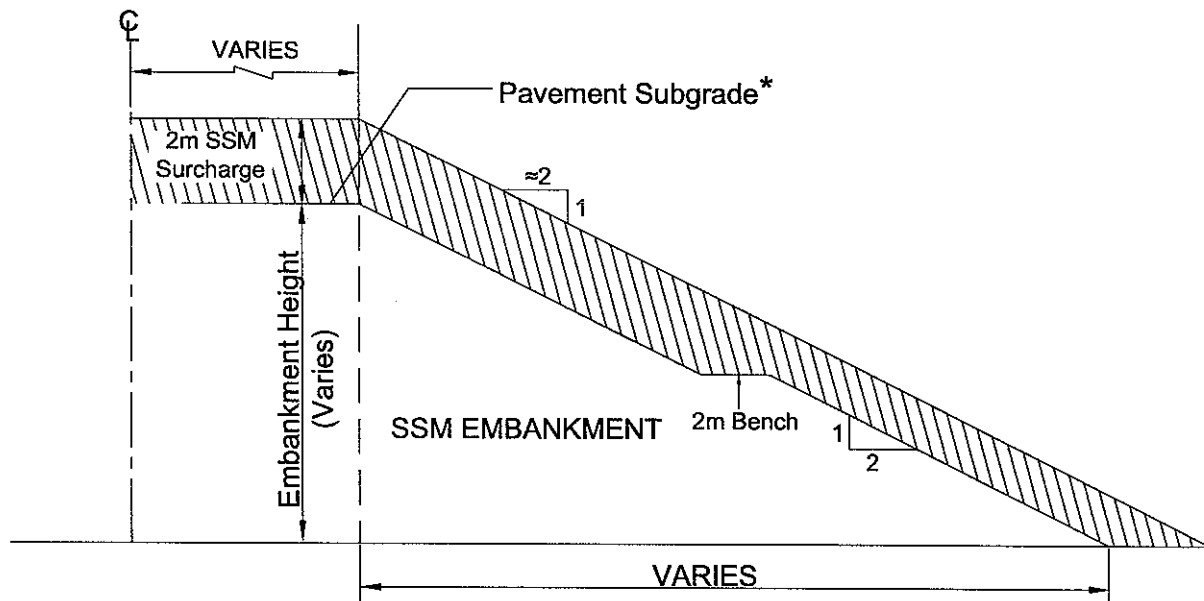
TERRAPROBE

File No. 1-09-4135

FIGURE G4



SSM Embankment <8m



SSM Embankment 8m \geq 12m

* Notes- Pavement subgrade to be established after removal of surcharge.
Only SSM surcharge recommended in order to minimize handling/sorting and compaction of dissimilar materials.

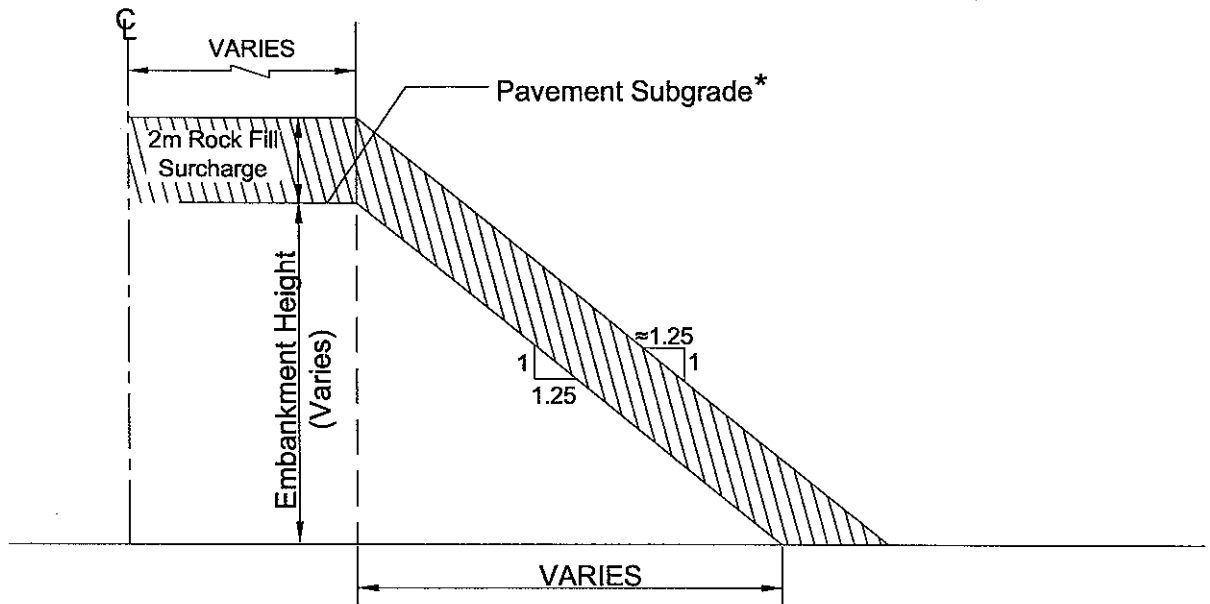
N.T.S

SURCHARGE ARRANGEMENT

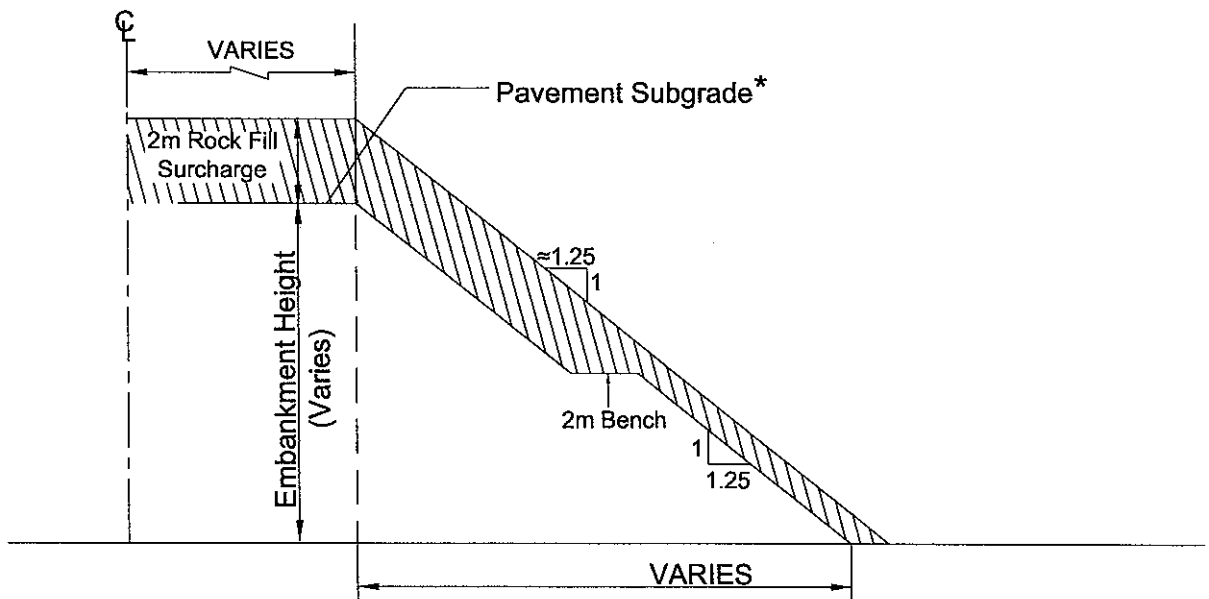
TERRAPROBE

File No. 1-09-4135

FIGURE G5



Rock Fill Embankment <10m



Rock Fill Embankment 10m \geq 12m

* Notes- Pavement subgrade to be established after removal of surcharge.

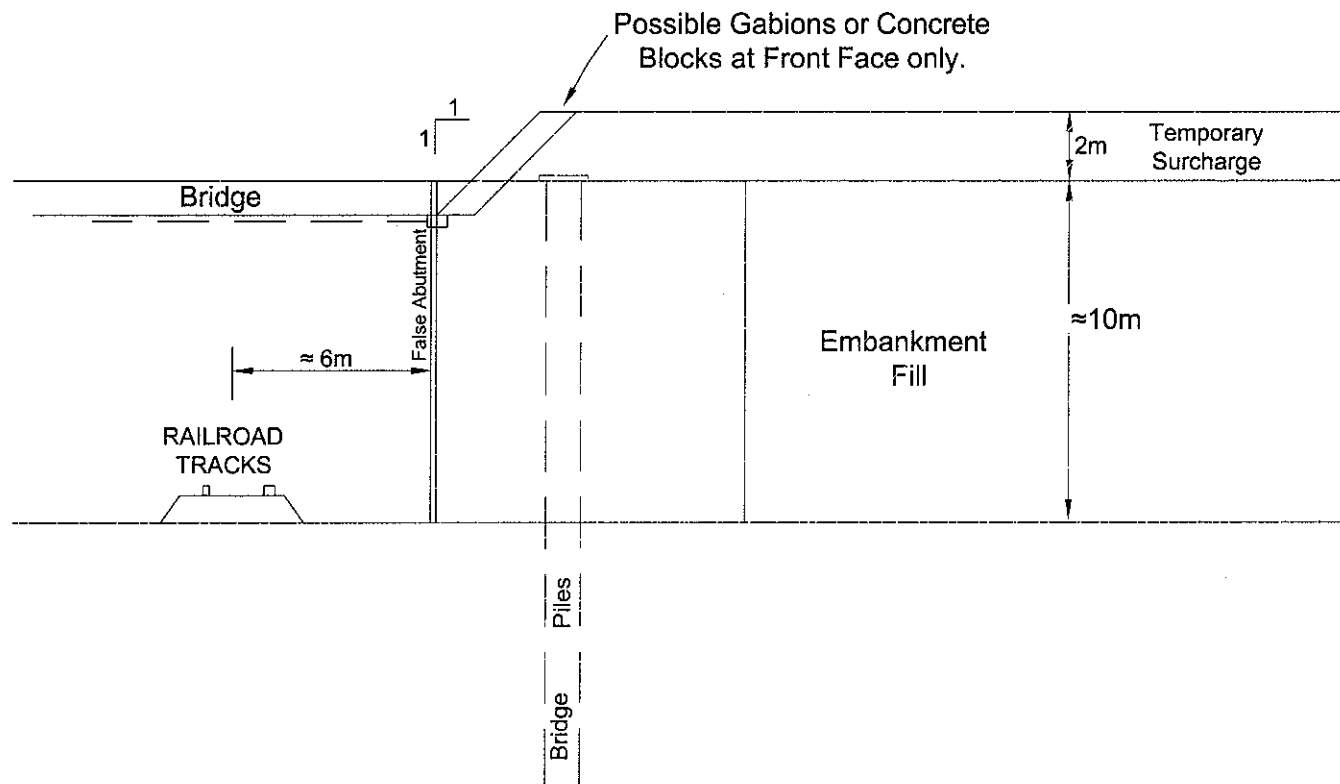
N.T.S

SURCHARGE ARRANGEMENT

TERRAPROBE

File No. 1-09-4135

FIGURE G6



N.T.S

TEMPORARY RETAINING WALL ARRANGEMENT

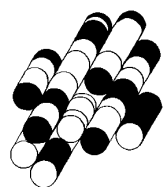
TERRAPROBE

File No. 1-09-4135

FIGURE G7

APPENDIX H

TERRAPROBE INC.



SUPPLY AND INSTALLATION OF EMBANKMENT MONITORING EQUIPMENT –
Item No.

Special Provision

1.0 GENERAL

1.1 Scope

This special provision contains the requirements for the supply and installation of the following geotechnical instruments:

- Settlement Plates (SP)
- Survey Benchmark/s (BM)

1.2 Purpose

The purpose of these instruments is to monitor settlements in the foundation soils under the new embankments. The data will be used for planning final paving operations and construction schedules. Settlements will be measured by level surveying of the top of the settlement rods.

The final paving operations shall be controlled by the instrumentation readings.

1.3 Personnel

The Contractor shall retain a Geotechnical Consultant with MTO classification of “Geotechnical (Structures and Embankments) – Medium Complexity”, to undertake the supply and installation of geotechnical instruments.

The Contractor (as referenced herein) shall be understood to refer to the Contractor and their Geotechnical Consultant.

1.4 Or equal

The term “or equal” shall be understood to indicate that the equal product is the same or better than the specified product in function, performance, reliability, quality and general configuration.

1.5 Notification

The Contract Administrator shall be notified a minimum of 15 working days in advance of commencing the installation of instruments.

1.6 Submission Requirements

The Contractor shall submit details of proposed installations including:

- Design and construction drawings, including equipment layout;
- Installation methodology and timing;
- Equipment and material specifications, data sheets;
- Location and types of survey benchmarks; and
- Installation schedule.

Submissions shall be made to the Contract Administrator a minimum of 15 days before the start of the instrument installation.

1.7 Subsurface Conditions

The subsurface conditions at the site(s) are described in the report:

- Foundation Investigation Report – Deep Cuts & High Fills, Highway 406 Twinning, Port Robinson Road to East Main Street, Ontario., W.P. 280-99-00, dated September 03, 2010, by Terraprobe Inc.

The owner warrants that the information provided in the report can be relied upon with the following exceptions.

1. Any interpretations of the data or opinions expressed in the report are not warranted; and
2. Although the raw measured data presented is warranted, the Contractor must satisfy himself as to the sufficiency of the information presented and obtain any updated or additional information, and perform any studies, analysis or investigations the Contractor deems necessary in order to prepare his design, at no additional cost to the Owner.

1.8 Equipment Operation and Weather Conditions

All installations and monitoring equipment and associated materials shall be capable of withstanding the range of temperatures possible for their location within the ground or on the surface. The instruments shall be capable of operating within the manufacturer's stated accuracy throughout the temperature range. Monitoring shall be conducted year round and the Contractor is advised that the equipment should be accessible for monitoring throughout the duration of the Contract.

2.0 INSTALLATION

A summary of instrumentation requirements is given in Table 2.1. Details and specific material requirements are presented elsewhere in this special provision.

Table 2.1 – Settlement Plates & Benchmark Quantities and Locations

INSTRUMENT I.D.	STATION	OFFSET FROM CENTRELINE (m)	NO. OF INSTRUMENTS
SP2-1	406S – E/W 10+000	0	1
SP2-2	406S – E/W 10+150	0	1
SP2-3	406S – E/W 10+200	0	1
SP2-4	406S – E/W 10+250	0	1
SP2-5	W – 406N 10+125	0	1
SP2-6	W – 406N 10+175	0	1
SP2-7	W – 406N 10+225	0	1
SP3-1	E/W – 406S 10+175	0	1
SP3-2	E/W – 406S 10+225	0	1
SP3-3	E/W – 406S 10+385	0	1
SP3-4	E/W – 406S 10+450	0	1
SP4-1	406NBL 12+175	0	1
SP4-2	406NBL 12+225	0	1
SP4-3	406NBL 12+275	0	1
SP4-4	406NBL 12+325	0	1
SP4-5	406NBL 12+475	0	1
SP4-6	406NBL 12+520	0	1
SP4-7	406NBL 12+575	0	1
SP4-8	406NBL 12+625	0	1
SP4-9	406NBL 12+800	0	1
SP4-10	406NBL 12+850	0	1
SP4-11	406NBL 12+900	0	1
SP4-12	406SBL 12+200	0	1
SP4-13	406SBL 12+250	0	1
SP4-14	406SBL 12+300	0	1
SP4-15	406SBL 12+450	0	1
SP4-16	406SBL 12+500	0	1
SP4-17	406SBL 12+550	0	1
SP4-18	406SBL 12+600	0	1
SP4-19	406SBL 12+650	0	1
SP4-20	406SBL 12+775	0	1
SP4-21	406SBL 12+825	0	1
BM-SE1	Southeast Quadrant	N/A	1
BM-SE2	Southeast Quadrant	N/A	1
BM-SW1	Southwest Quadrant	N/A	1
BM-SW2	Southwest Quadrant	N/A	1
BM-NE1	Northeast Quadrant	N/A	1
BM-NW1	Northwest Quadrant	N/A	1
Total Instruments			38

2.1 Instrument Location

Prior to the installation of instruments, the Contractor shall accurately survey and stake the location of each instrument and obtain a ground surface elevation at each instrument location.

2.2 Survey Benchmarks (BM)

The Contractor shall provide a minimum of two non-yielding deep seated survey benchmarks (BM) at the site. Alternatively the contractor may select stable non-settling points on existing structures within the area subject to approval by the contract administrator.

The number and locations(s) of benchmark(s) shall be such that direct sighting is possible from all settlement rods to at least one benchmark.

2.3 Accuracy of Surveying for Elevations

Elevations shall be surveyed referenced to Geodetic datum to an accuracy of ± 2 mm or better.

2.4 Monitoring Instrument Location

All monitoring instruments shall be located in MTM NAD83 northing and easting coordinates.

2.5 Materials and Equipment

The Contractor shall supply all materials and equipment required for the installation of instrumentation unless noted otherwise.

2.6 Underground Utilities

The Contractor shall be responsible for locating and protecting all underground utilities prior to drilling boreholes for installing instruments. Any damage to underground utilities caused by the Contractor's work shall be repaired by the Contractor, at no cost to the Ministry.

2.7 Marking and Labelling

The location of any above ground monitoring fixture shall be made clearly visible to nearby traffic before, during and after embankment construction. Marking shall be of sufficient size to be visible from a reversing vehicle and after heavy snow falls.

Instruments shall be clearly labelled in the field, each instrument having a unique identifier. The labelling shall remain legible for at least 1 year.

2.8 Protection of Instruments

All instruments shall be adequately protected by the Contractor such that they are not damaged during construction. Any instrument damaged by the Contractor's work shall be immediately replaced at no cost to the Ministry.

2.9 Installation Program

Instrument installation shall be completed before any embankment construction. Table 2.2 provides a summary of the installation schedule requirements.

Table 2.2 – Installation Program

TYPE	START INSTALLATION	FINISH INSTALLATION
SP	After excavating to recommended subgrade	On completion of embankment construction
BM	Before commencement of embankment construction	Before commencement of embankment construction

3.0 BENCHMARK (BM) – SUPPLY & INSTALLATION

3.1 GENERAL

3.1.1 Scope

This Section contains the requirements for the supply and installation of benchmark/s (BM).

The purpose of the benchmark is to provide non-settling references for the surveying of settlement rods.

3.1.2 General Procedure

The benchmark shall be installed prior to embankment construction. The number and locations of benchmarks shall be such that direct sighting is possible from all settlement rods to at least one benchmark. Elevations shall be surveyed to an accuracy of $\pm 2\text{mm}$ or better.

Prior to the installation of instruments, the Contractor shall accurately survey and stake the locations of each instrument and obtain a ground elevation at each instrument location.

3.1.3 Location

Benchmarks shall be located and installed outside of the area of construction activity. Notwithstanding the installation details provided herein the contractor may select stable non-settling points on existing structures within the area subject to approval by the contract administrator.

Table 3 – Approximate Bench Mark Locations

Station	Offset (m)	No. of BM	Estimated Rod Anchor Elevation (m)
South East Quadrant			
Outside of Construction Area	N/A	BM-SE1	165
Outside of Construction Area	N/A	BM-SE2	165
South West Quadrant			
Outside of Construction Area	N/A	BM-SW1	165
Outside of Construction Area	N/A	BM-SW2	165
North East Quadrant			
Outside of Construction Area	N/A	BM-NE1	166
North West Quadrant			
Outside of Construction Area	N/A	BM-NW1	166

MATERIALS

3.2.1 General

The Contractor shall supply all materials and equipment required for the installation of the benchmark.

3.2.2 Rod

The Contractor shall supply a steel pipe Schedule 40 with an outside diameter not less than 25.4 mm (1”), supplied in lengths as required to complete the installation as described.

The top end of each length of rod shall be threaded to receive a cap. A rounded cap shall be installed at the top of the rod in such a way that a single survey point can be clearly identified and returned to.

3.2.3 Sand

The Contractor shall supply clean washed sand. The sand shall be Sakcrete washed general-purpose sand – or equal.

3.2.4 Grout

The Contractor shall supply cement-bentonite grout. A suitable grout mix design consists of 23 kg of bentonite (OPSS 1205), 143 litres of water and 40 kg of cement (Type G.U. – OPSS 1301).

3.2.5 Rod Anchor Grout

The Contractor shall supply cement-bentonite grout. A suitable grout mix design consists of 14 kg of bentonite (OPSS 1205), 49 litres of water and 40 kg of cement (Type G.U. – OPSS 1301).

3.2.6 Friction Reducing Sleeve

The Contractor shall supply a friction reducing sleeve consisting of Schedule 50 – 50.8 mm (2”) O.D. PVC pipe cut perpendicular to the axis of the pipe.

3.3 INSTALLATION

3.3.1 General

The Contractor shall install the benchmark in accordance with the information below.

3.3.2 Borehole Installation

The borehole shall be advanced to the rod anchor elevations provided in Table 3 using suitable drilling techniques. The diameter of the borehole shall be sufficient to fit the rod, friction reducing sleeve and rod anchor. The sides of the borehole shall be stable and the borehole shall be free of drilling mud and debris.

3.3.3 Rod

The coupling of the rods shall be such that all sections have the same axis and no separation or contraction will occur at the couplings.

3.3.4 Rod Anchor

The rod shall be installed vertically in the borehole with its bottom end resting at the bottom of the borehole. The bottom portion of the rod shall be fixed against the surrounding native soil by grouting the bottom 0.5 m of the borehole to form a concrete/soil anchor.

Once grouting is completed and the rod anchor grout has set, the Contractor shall pour 0.5 m of clean sand in the borehole above the concrete/soil anchor to create a base for the end of the friction reducing sleeve to rest on.

The elevation of the bottom of the rod anchor shall be determined by measuring the length of the rod to the ground surface elevation.

3.3.5 Friction Reducing Sleeve

The friction reducing sleeve shall be over the entire length of the rod above the rod anchor and sand.

3.3.6 Installation Details

The elevation, easting and northing of the top of the benchmark rod shall be surveyed.

3.4 COORDINATION WITH MONITORING

3.4.1 Notification

The Contractor shall notify the Contract Administrator no later than 3 days after installing a benchmark. At this time the Contractor shall also supply the following information to the Contract Administrator.

- Location of the rod anchor and elevation top of rod;
- Dates of installation;
- Stratigraphic log of subsurface conditions at the benchmark, including drilling method notes;
- Installation notes/sketches; and
- Description of benchmarks, sleeve and rod anchor.

3.4.2 Monitoring

Monitoring of settlements with reference to the benchmark shall be done by others. Monitoring shall be conducted during and following the embankment construction. The Contractor shall provide installation information as specified above and provide access to

the benchmark for monitoring including, but not limited to snow clearing in the winter. The Contractor shall provide electric power and general area lighting as needed.

3.5 REPORTING

The Contractor shall record and report relevant installation details to the Contract Administrator. These include, but are not limited to:

- Benchmark easting, northing in MTM NAD83 coordinates;
- Elevation of bottom of rod anchor and top of rod relative to Geodetic datum;
- Dates of installation; and
- Installation notes/sketches.

4.0 SETTLEMENT PLATES (SP) – SUPPLY & INSTALLATION

4.1 GENERAL

4.1.1 Scope

This Section contains the requirements for the supply and installation of settlement plates.

The purpose of the settlement plates is to monitor settlements of the foundation soils below the embankment base. The settlement readings shall help to establish the timing for the final paving operations. Settlement is measured by survey of the top of the rod with reference to stable, non-settling benchmarks.

4.1.2 General Procedure

The settlement rods shall be attached to a plate at the existing ground surface. As embankment construction proceeds the rods shall be extended above the new top of embankment.

Sleeves around the rods shall be installed to reduce friction and allow uninhibited movement of the rod with the plate.

A protective surround shall be extended with the rods as embankment construction proceeds.

4.1.3 Location

The locations of the settlement plates are shown on the Contract Drawings and are given in Table 4.

Table 4 – Approximate Settlement Plate Locations

Station	Offset (m)	No. of Settlement Plate(s)	Estimated Thickness of Embankment (m)*
Site 2 – Woodlawn I/C Southeast Quadrant			
406S – E/W 10+000	CL	1	8.8
406S – E/W 10+150	CL	1	8.8
406S – E/W 10+200	CL	1	6.7
406S – E/W 10+250	CL	1	4.3
W – 406N 10+125	CL	1	4.5
W – 406N 10+175	CL	1	6.1
W – 406N 10+225	CL	1	8.4
Site 3 – Woodlawn I/C Southwest Quadrant			
E/W – 406S 10+175	CL		4.9
E/W – 406S 10+225	CL	1	7.6
E/W – 406S 10+385	CL	1	9.2
E/W – 406S 10+450	CL	1	7.3

Table 4 – Approximate Settlement Plate Locations (Continued)

Station	Offset (m)	No. of Settlement Plate(s)	Estimated Thickness of Embankment (m)*
Site 4 – Highway 406 NBL & SBL			
406NBL 12+175	CL	1	4.4
406NBL 12+225	CL	1	5.4
406NBL 12+275	CL	1	6.7
406NBL 12+325	CL	1	7.7
406NBL 12+475	CL	1	9.2
406NBL 12+520	CL	1	9.4
406NBL 12+575	CL	1	9.4
406NBL 12+625	CL	1	9.1
406NBL 12+800	CL	1	6.8
406NBL 12+850	CL	1	5.6
406NBL 12+900	CL	1	4.4
406SBL 12+200	CL	1	5.6
406SBL 12+250	CL	1	5.3
406SBL 12+300	CL	1	8.2
406SBL 12+450	CL	1	10.8
406SBL 12+500	CL	1	11.3
406SBL 12+550	CL	1	10.7
406SBL 12+600	CL	1	10.0
406SBL 12+650	CL	1	8.1
406SBL 12+775	CL	1	6.5
406SBL 12+825	CL	1	4.7

Notes: * Embankment thickness based on surface elevation of removal levels/stripping Depths and does not include 2 m surcharge height.

4.2 MATERIALS

4.2.1 General

The Contractor shall supply all materials and equipment required for the installation of the settlement plates.

4.2.2 Plate

The Contractor shall supply a steel plate with thickness of at least 6.35 mm. The plate shall be at least 0.5 m by 0.5 m.

4.2.3 Rod

The Contractor shall supply a steel pipe Schedule 40 with an outside diameter not less than 25.4 mm (1”), supplied in lengths as required to complete the installation as described in Section 4.3.

The top end of each length of rod shall be threaded to receive a cap. A rounded cap shall be installed at the top of the rod in such a way that a single survey point can be clearly identified and returned to.

4.2.4 Friction Reducing Sleeve

The Contractor shall supply a friction reducing sleeve consisting of Schedule 40 – 50.8mm (2”) O.D. PVC pipe cut perpendicular to the axis of the pipe.

4.2.5 Protective Surround

The Contractor shall supply a protective surround for the portion of the rod within the embankment. The surround shall consist of 300 mm diameter corrugated steel pipe (CSP – OPSS 1801) with the ends cut perpendicular to the axis of the pipe and free of burrs and sharp edges. The space between the CSP and the Friction Reduction Sleeve (PVC pipe) shall be filled with medium to coarse sand.

4.3 INSTALLATION

4.3.1 General

The Contractor shall install settlement plates as per the Contract Drawings provided in addition to what is stated or emphasized below.

4.3.2 Settlement Plate

The settlement plate shall be installed horizontally after subgrade preparation is completed and prior to fill placement.

The elevation of the base of the plate shall be surveyed before backfilling.

4.3.3 Rod

The rod shall be fixed to the center of the plate and installed perpendicular to the plate.

The coupling of the rods shall be such that all sections have the same axis and no separation or contraction will occur at the couplings.

4.3.4 Friction Reducing Sleeve

The friction reducing sleeve shall be over the entire length of the rod that is below ground and within the embankment fill except that the cap on top of the settlement rod shall extend 25 mm above the top of the friction sleeve at all times.

4.4 EXTENSION OF ROD

The settlement rods shall be extended upwards as the embankment is constructed so that the top of the rod is always at least 0.3 m but not more than 2 m above the surrounding fill.

4.4.1 Protective Surround

The CSP, Friction Reducing Sleeve and sand protective surround shall be extended with the rods.

The settlement rod shall be in the center of the CSP and friction-reducing sleeve.

The annulus between the CSP and the friction-reducing sleeve shall be filled with sand to a level not higher than the top of the sleeve.

4.4.2 Installation Details

The elevation, easting and northing of the center of the base of the plate shall be surveyed.

The elevation, easting and northing of the top of the rod shall be surveyed.

The total distance from the base of the plate to the top of the rod shall be measured to an accuracy of ± 2 mm or better.

4.5 COORDINATION WITH MONITORING

4.5.1 Notification

The Contractor shall notify the Contract Administrator no later than 3 days after installing a settlement plate. At this time the Contractor shall also supply the following information to the Contract Administrator.

- Elevation of plate and rod referenced to Geodetic datum;
- Dates of installation;
- Installation notes/sketches; and
- Description of settlement rods, sleeve and plate.

Adjustments in the length of any settlement rod shall be coordinated with the Contract Administrator to allow surveying by others of the elevation of the top of the rod immediately before and immediately after adjustment. This surveying is necessary to accurately track the settlement data.

4.5.2 Monitoring

Monitoring of the settlement plates shall be done by others. Monitoring shall be conducted during the embankment construction and preload period. A target settlement of 100 mm is specified. A minimum preload period of 4 months is required. The Contractor shall provide installation information as specified above and provide access to the settlement rods for monitoring including, but not limited to a level scaffolding

platform and ladder, if required and snow clearing in the winter. The Contractor shall provide electric power and general area lighting as needed for reading the instruments.

4.6 REPORTING

The Contractor shall record and report relevant installation details to the Contract Administrator. These include, but are not limited to:

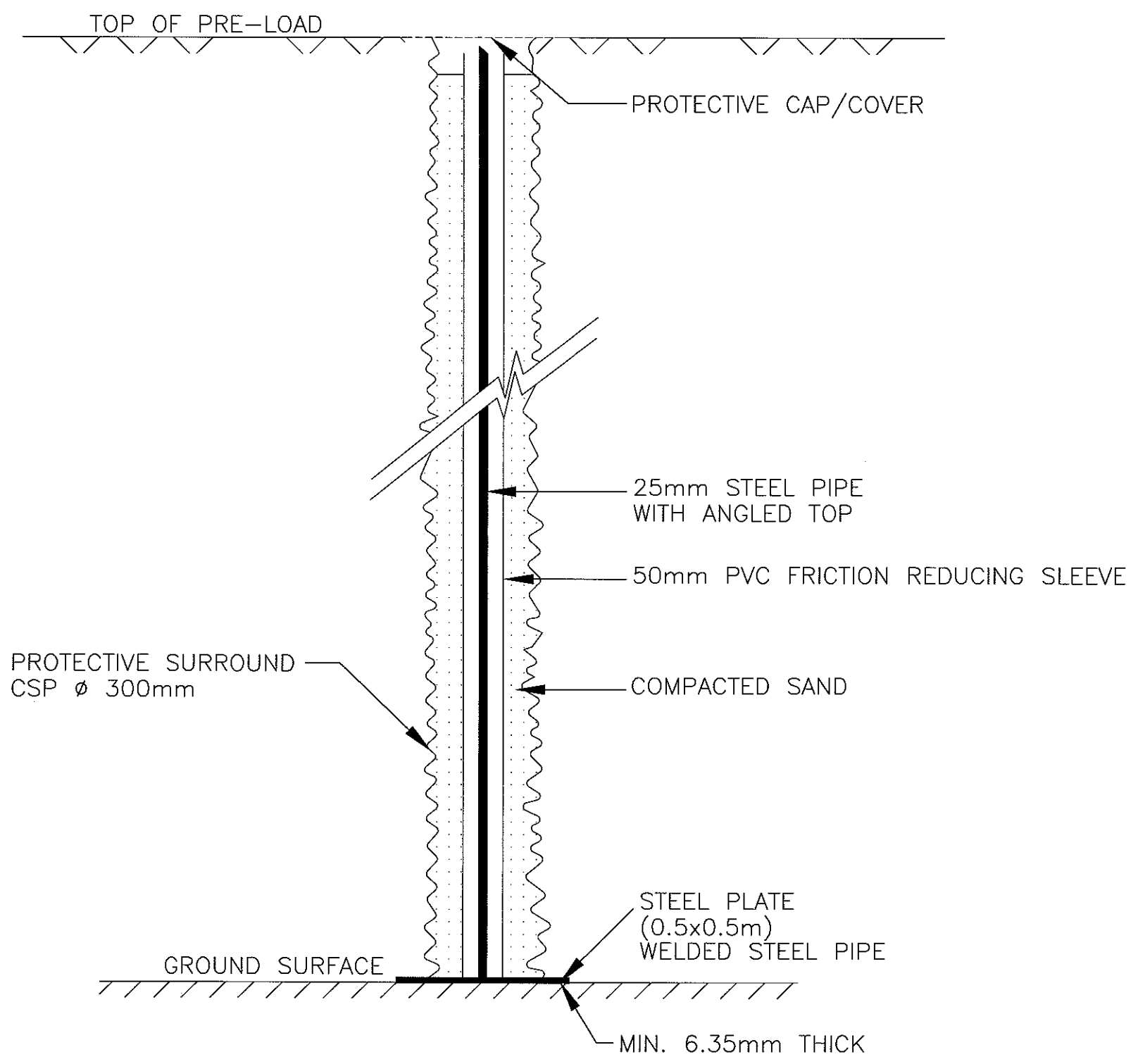
- Settlement rod easting, northing referenced to MTM NAD83 coordinates;
- Elevation of the plate and the top of the rod referenced to Geodetic datum;
- Distance between base of plate and top of rod;
- Dates of installation; and
- Installation notes/sketches.

5.0 PAYMENT

Basis Of Payment

Payment at the Lump Sum price for this tender item shall be full compensation for all labour, monitoring equipment and material to do the work.

C:\Users\jwheeler\Documents\1-06-4135 HWY 406 HIGH FILLS\1-06-4135 WOODLAWN SETTLEMENT PLATE\1-06-4135 HWY 406 SETTLEMENT PLATE DETAIL.dwg, XREF



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AND/OR MILLIMETERS
UNLESS OTHERWISE SHOWN

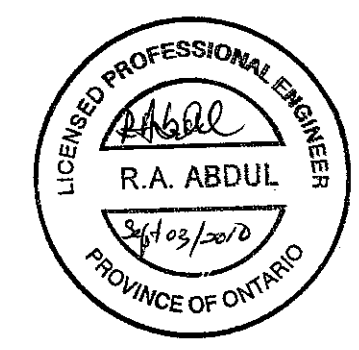
CONT No
WP No 280-99-00

DEEP CUTS & HIGH FILLS
HWY406 WOODLAWN INTERCHANGE
SETTLEMENT MONITORING
INSTRUMENT DETAILS



GENERAL NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE SETTLEMENT MONITORING INSTRUMENT LAYOUT DWG.

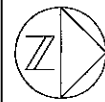


REVISIONS	DATE		BY		DESCRIPTION	
	DATE	BY	DESCRIPTION	DATE	SEPT. 2010	
DESIGN	R.A.	CODE	CHBDC2006	LOAD	DATE	SEPT. 2010
DRAWN	K.C.	CHK	R.A.	STRUCT		

C:\Users\jane\Documents\1-09-4125 HWY 406 HIGH RAIL-109-1435 WOODLAWN SETTLEMENT PLATE 09-4125 1ST - WOODLAWN SETTLEMENT PLATE.dwg, 09/04/10

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETERS
UNLESS OTHERWISE SHOWN

CONT No
WP No 280-99-00




HWY 406
WOODLAWN I/C SOUTHEAST QUADRANT
SETTLEMENT MONITORING
INSTRUMENT LAYOUT
SITE 2

 **Terraprobe Inc.**
Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing
10 Bram Court - Brampton Ontario L6W 3R6 (905) 796-2650

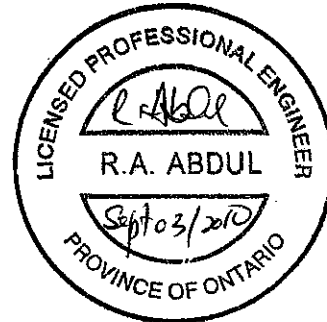
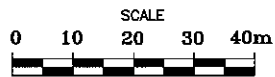
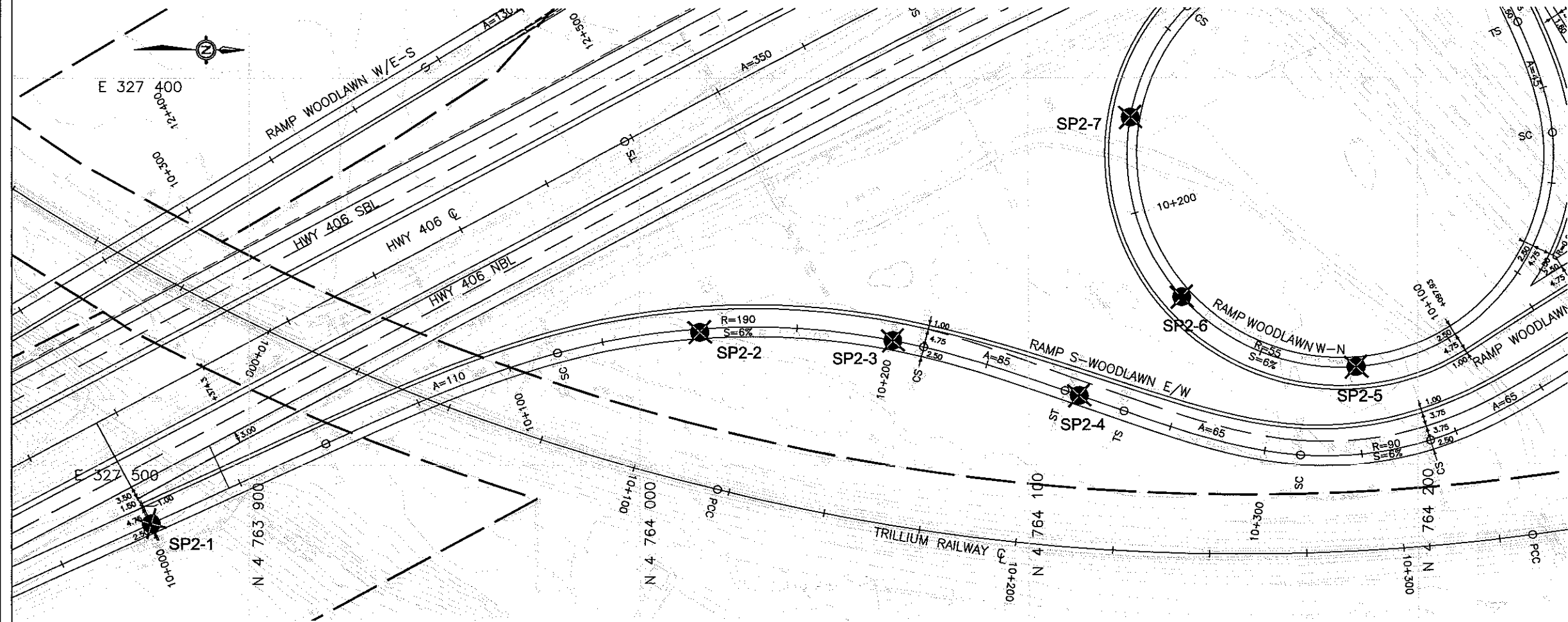
GENERAL NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH INSTRUMENT DETAILS DRAWING.

LEGEND

 **SP1** APPROXIMATE LOCATION OF SETTLEMENT PLATE (SP)

INSTRUMENT LOCATIONS			
I.D.	LOCATION	STATION	OFFSET FROM CENTRELINE(m)
WOODLAWN I/C SOUTHEAST QUADRANT-SITE 2			
SP2-1	406 S-E/W	10+000	0
SP2-2	406 S-E/W	10+150	0
SP2-3	406 S-E/W	10+200	0
SP2-4	406 S-E/W	12+250	0
SP2-5	406 S-E/W	10+125	0
SP2-6	406 S-E/W	10+175	0
SP2-7	406 S-E/W	10+225	0



REVISIONS				
DATE	BY	DESCRIPTION		
DESIGN	RA	CODE	CHBDC2006	LOAD
DRAWN	K.C.	CHK	RA	STRUCT

DATE	SEPT. 2010
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METRIC
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AND/OR MILLIMETERS
UNLESS OTHERWISE SHOWN

CONT No
WP No 280-99-00

HWY 406
WOODLAWN I/C SOUTHWEST QUADRANT
SETTLEMENT MONITORING
INSTRUMENT LAYOUT
SITE 3



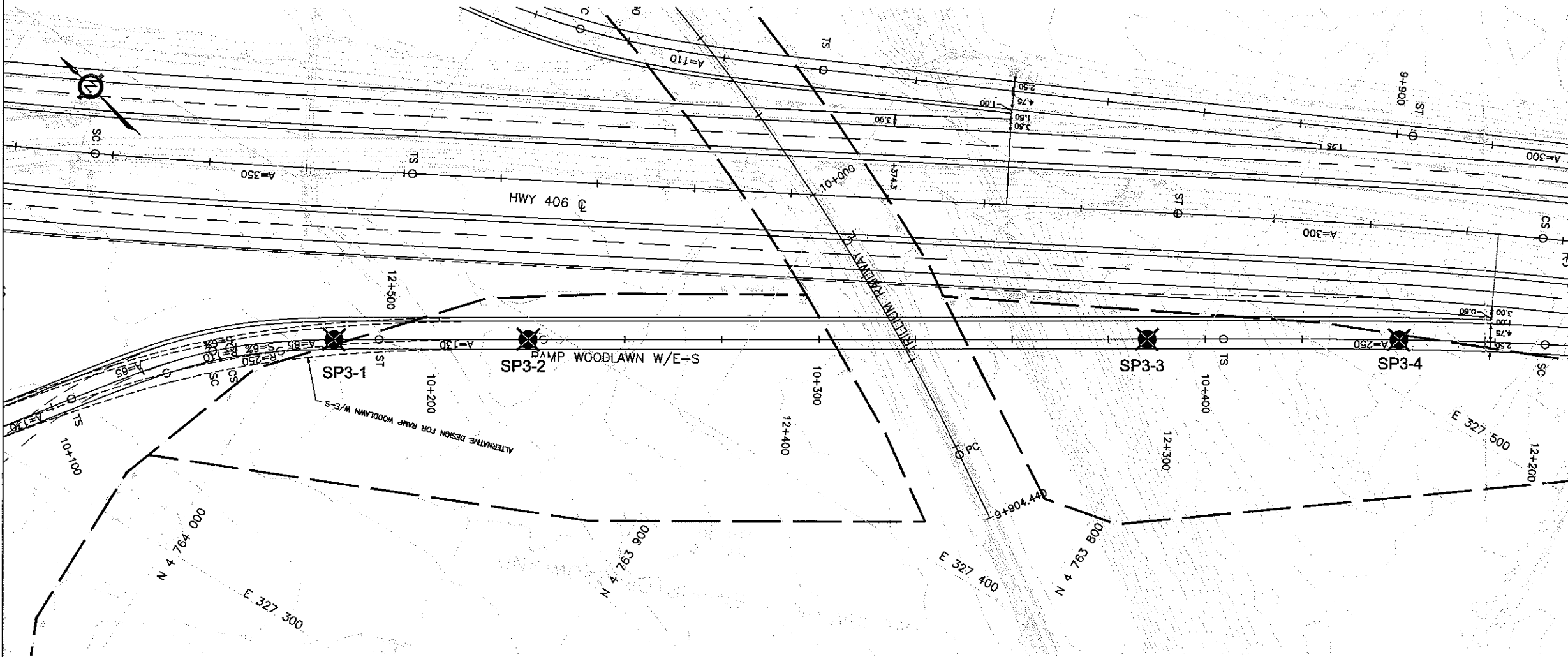
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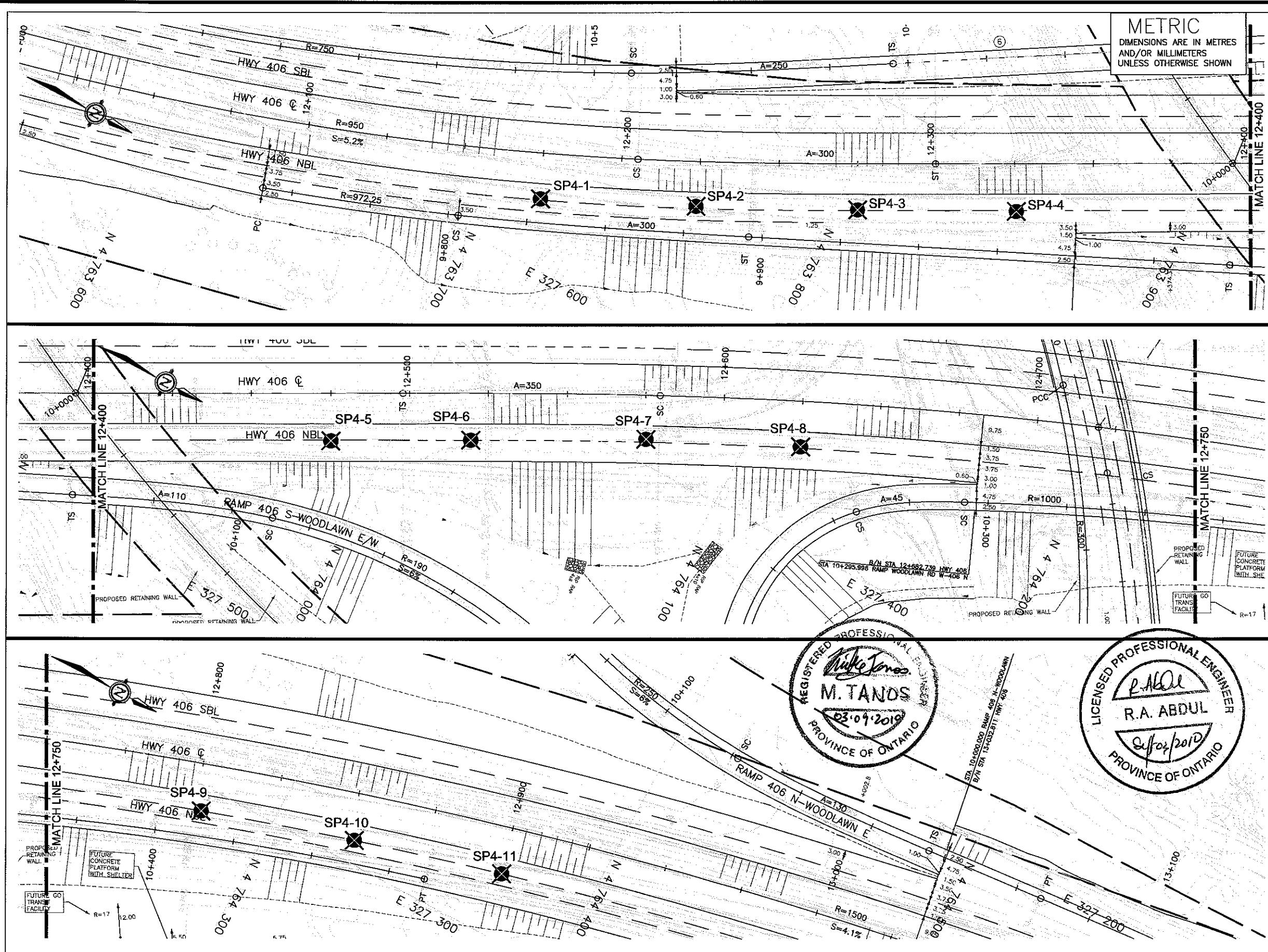
LEGEND

SP1 APPROXIMATE LOCATION OF SETTLEMENT PLATE (SP)

INSTRUMENT LOCATIONS			
I.D.	LOCATION	STATION	OFFSET FROM CENTRELINE(m)
WOODLAWN I/C SOUTHWEST QUADRANT-SITE 3			
SP3-1	E/W-406S	10+175	0
SP3-2	E/W-406S	10+225	0
SP3-3	E/W-406S	10+385	0
SP3-4	E/W-406S	10+450	0

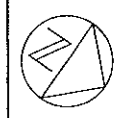
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AND/OR MILLIMETERS
UNLESS OTHERWISE SHOWN

CONT No
WP No 280-99-00



HWY 406 NBL
SETTLEMENT MONITORING
INSTRUMENT LAYOUT
SITE 4

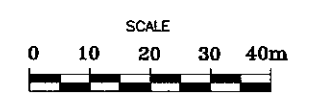


- GENERAL NOTES:
- THIS DRAWING TO BE READ IN CONJUNCTION WITH INSTRUMENT DETAILS DRAWING.

LEGEND

SP1 APPROXIMATE LOCATION OF SETTLEMENT PLATE (SP)

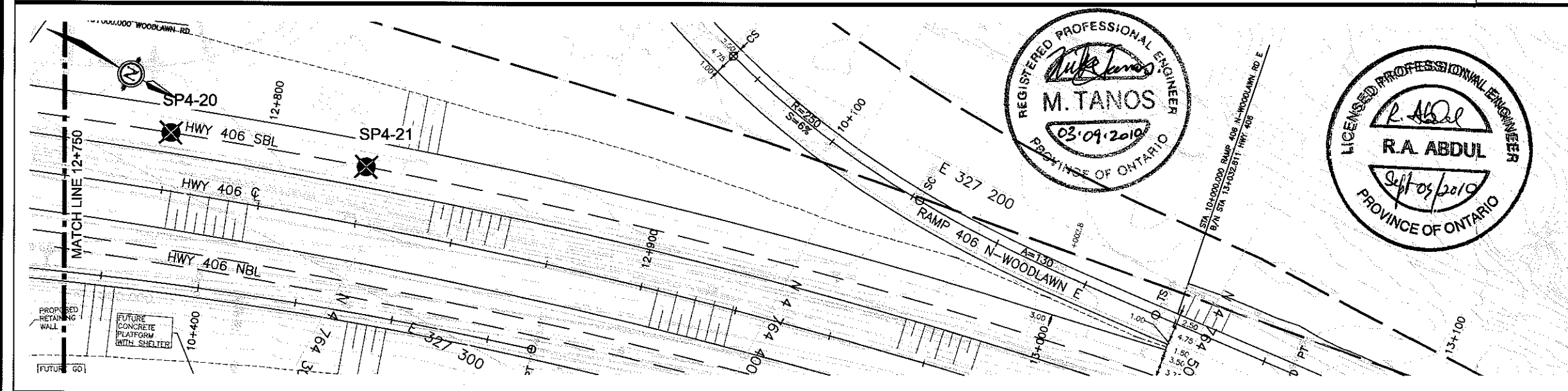
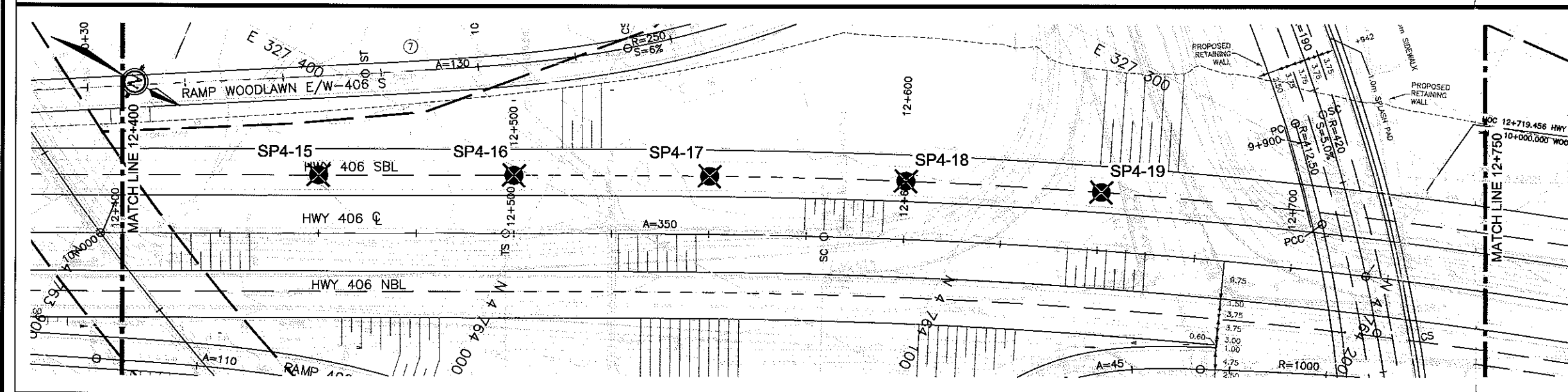
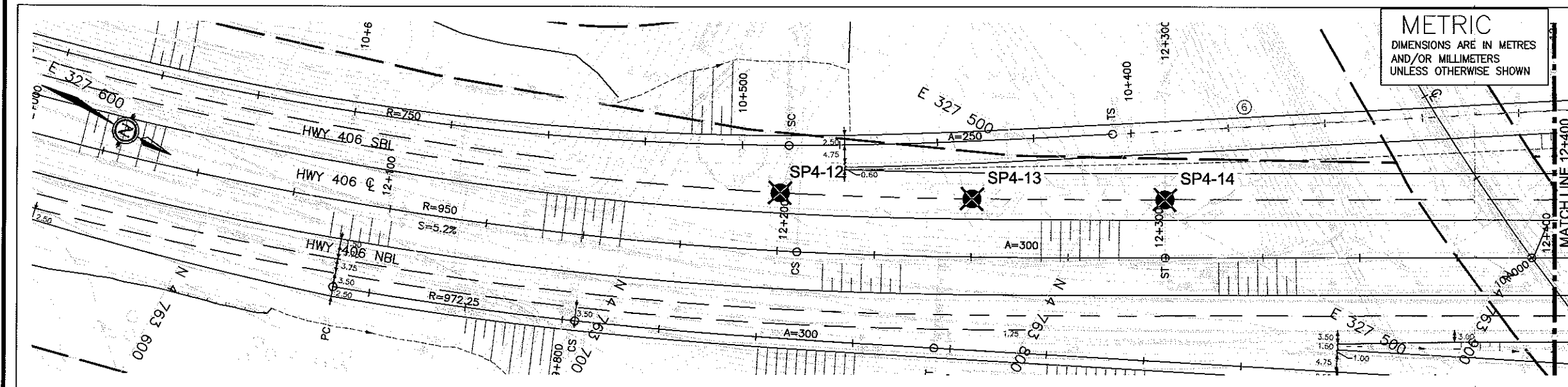
INSTRUMENT LOCATIONS			
I.D.	LOCATION	STATION	OFFSET FROM CENTRELINE(m)
HWY406 NBL-SITE 4			
SP4-1	406NBL	12+175	0
SP4-2	406NBL	12+225	0
SP4-3	406NBL	12+275	0
SP4-4	406NBL	12+325	0
SP4-5	406NBL	12+475	0
SP4-6	406NBL	12+520	0
SP4-7	406NBL	12+575	0
SP4-8	406NBL	12+625	0
SP4-9	406NBL	12+800	0
SP4-10	406NBL	12+850	0
SP4-11	406NBL	12+900	0



REVISIONS				
DATE	BY	DESCRIPTION		
DESIGN R.A.	CODE CHB02006	LOAD	DATE SEPT. 2010	
DRAWN K.C.	CHK R.A.	STRUCT		

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C:\Users\james\Documents\109-4135 HWY 406 HIGH FILLS\109-4135 WOODLAWN SETTLEMENT PLATE\109-4135 WOODLAWN SETTLEMENT PLATE.dwg, 10/04/10



CONT No
WP No 280-99-00



HWY 406 SBL
SETTLEMENT MONITORING
INSTRUMENT LAYOUT
SITE 4



GENERAL NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH INSTRUMENT DETAILS DRAWING.

LEGEND

SP1 APPROXIMATE LOCATION OF SETTLEMENT PLATE (SP)

INSTRUMENT LOCATIONS

I.D.	LOCATION	STATION	OFFSET FROM CENTRELINE(m)
HWY406 SBL-SITE 4			
SP4-12	406SBL	12+200	0
SP4-13	406SBL	12+250	0
SP4-14	406SBL	12+300	0
SP4-15	406SBL	12+450	0
SP4-16	406SBL	12+500	0
SP4-17	406SBL	12+550	0
SP4-18	406SBL	12+600	0
SP4-19	406SBL	12+650	0
SP4-20	406SBL	12+775	0
SP4-21	406SBL	12+825	0



REVISIONS	DATE	BY	DESCRIPTION
DESIGN R.A.	CODE CHB02005	LOAD	DATE SEPT 2010
DRAWN K.C.	CHK R.A.	STRUCT	